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Contents

Assessment of cooperative education placements: a faculty view

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INTRODUCTION

Assessment of work placements is a very topical issue throughout the international cooperative education community (Coll et al., 2002; Hinett & Knight, 1996) and is the subject of a great deal of research and investigation (Boud & Falchikov, 2005; Canale & Duwart, 1999). Most research in this area has focused on issues such as; what skills are learned, which are important, how to define and 'quantify' non-technical skills and the importance of having these skills measured.   Often the views of educationalists and education theorists are drawn on to understand the different types of learning and its value and impact on students (Wenger, 1998; Wertsch, 1991).   While it is apparent that many involved with cooperative education programs seek to understand how learning occurs during work placements (Eames 2005), they also want and need to disseminate the holistic nature of the learning and its impact to the wider education community.

The focus of this research is to determine how one stakeholder cohort (i.e., faculty) within the co-op partnership views the difficult area of assessment. Faculty are an integral and vital part of any cooperative education program but their views have remained largely uncanvassed. Currently a large research project is being undertaken at the University of Waikato in New Zealand which explores faculty views of cooperative education in general, and the focus of this paper is faculty views of current assessment processes of work placements.

BACKGROUND

Cooperative education placements in the School of Science and Engineering at the University of Waikato are administered by the Placement Coordinators. Assessment for each student placement is from two sources; an employer evaluation that is completed by the workplace supervisor, and the grading of a placement report by the faculty supervisor (a specialist in that area). The employer evaluations assess student skills in the workplace, from basics like punctuality, reliability, through to speed of learning, use of initiative and development of independent thinking. Employers are also given an opportunity for written comments, providing some valuable feedback for students.

Faculty are asked to read and give editorial feedback on the first (draft) submission of the student placement report. The editorial feedback focuses on basic report writing skills such as punctuation, grammar, as well as the structure of sections, the scientific accuracy of content, logical flow, formatting and referencing. The placement report includes a section about the organization (including business structure, finance, markets), and a reflective learning section where students reflect on their personal and professional development throughout the placement. Students submit a final version of the report after amendments (in much the same way a thesis is submitted, edited and re-submitted) and then the report receives a grade. Site visits are undertaken by the coordinators and evaluations from the visits are often included in moderating of the two forms assessment.

METHODS

The faculty members in the School of Science and Engineering and School of Computing and Mathematical Sciences at the University of Waikato were surveyed to ascertain general trends of opinion on various themes on cooperative education. The survey was presented in a tick-box format with questions arranged in thematic groups (Boumer, 1996; Cohen, 2000). Participants were asked to rate each question using a five point Likert Scale, (1 = 'strongly disagree' and 5 = 'strongly agree'). A section was made available for comments to be written by faculty. The survey was sent to 139 faculty members with 76 completed surveys being returned giving a response rate of 57%. Information gathered was analyzed for trends in opinions, and to indicate areas where further investigation is needed. Accumulated data relevant to this paper have been summarized as an appendix. For clarity, the data has been collapsed into three categories, Disagree, Ambivalent/Undecided and Agree, and

converted to percentages. Comments written by faculty have been transcribed and are used in the text where appropriate.

In this paper the broad questions investigated include:

- Are cooperative education work placements adequately assessed by written reports alone?
- Are Employer evaluations necessary?
- How would student input to assessment be viewed?
- Would oral presentations be useful additions or alternatives?
- Should placement reports be marked by a specialist in the field of study?
- Should grading be based on pass/fail or use the full grading A+ to F (0 - 100%)?
- Is placement report marking a good use of faculty time?
- Does feedback on written reports provide improved student learning?; and
- Does faculty input on those reports provide them with a teaching opportunity?

RESULTS

The findings suggest that there is general support from faculty of the current assessment system, but there are some areas of concern/uncertainty and there is an indication from faculty that assessment methods could be revisited (see appendix).

Traditionally, students are assessed based on a written report, but faculty broadly support the notion that work placements are not adequately assessed by a written report alone (56%), and faculty appreciate that the main supervision of students and their learning and behavior is off campus; therefore evaluation input from their work place supervisors is critical (82% agree). Faculty views on the possibility of having student input to placement assessment were mixed (34% agree that students should have input, 30% disagreeing and 37% ambivalent), but oral presentations were felt to be a useful inclusion as an assessment tool (62% agreed), but not the sole method of assessment (68% agree).

Report assessment by specialists who have worked or researched in similar fields to the student placement is important (51% agreed 28% disagree), and that a full grading system using 0-100% (A+ to F) is preferable to a simple pass/fail (59% agree 25% disagree) indicates a general desire by faculty to maintain a strong academic rigor when it comes to work placement assessment.

In order to maximize learning, current practice is to utilize a report hand in system similar to that used for a thesis/dissertation where students prepare their first submission, often with assistance from the workplace supervisors, for a the faculty supervisor to read, edit, and give comment. Whilst acknowledging that students learn from feedback given on written reports (45% agree) there is a substantial proportion of faculty who remain unconvinced, with 42% holding a neutral opinion. Faculty do recognize that their feedback on draft reports is a valuable teaching opportunity (63% agree) and this is supported by only 20% of faculty thinking that report marking is a poor use of their time.

DISCUSSION

"Grading of coop placement reports is problematic."
"Not a simple issue – lots of variables involved …"

Comments from the survey indicate that assessment and grading of placements is a difficult and multi-layered problem. Findings suggest that it would be worthwhile, exploring a multi-faceted approach to student placement assessment that included oral presentations along with the current use of written reports and employer evaluations. The response shown for some student input (ambivalent) could lead to the inclusion of student self evaluation of their non-technical skills and professional development as a part of the assessment. These inclusions could go some way to addressing perceived problems by faculty not addressed by the current methods of assessment.

While it is apparent that faculty supports the application of full academic rigor to placement assessment (in particular the placement report), based on the support for assessment by specialists in the field of study, how this can be achieved for non-technical skills is still a conundrum. Faculty generally acknowledge that 'soft' skills are a major learning benefit of placements (McCurdy et al., 2005) but they have great difficulty in assessing those skills as they are, in scientific terms, not able to be quantified or measured. This leads to faculty being unsure of their ability, and perhaps unwilling to accept

2

responsibility, for assessing these skills as indicated by a comment from the survey: "Essays on company/CRI structure and personal development have no place in a report when they take up time of academic staff specialist in the subject area of the placement." Another area of probable concern is the non-recognition of the *applied* value of 'soft' skills by science faculty, hence some reluctance to acknowledge the importance of these skills in today's science and technology research world and the thornier issues of how to assess them (Zegwaard et al., 2003).

There is a constant low level 'grumble' about placement report marking, perhaps a combined effect of the occasional poor match between the placement report and the faculty member's own research interests, a general feeling of non-involvement with the work or research included in the placement, as expressed by one staff member: "The role of the academic supervisor in these degrees is very detached," and also because of the wide variety of placements in each subject area. Faculty may find it difficult assess reports, and reach a comparative grade for routine or repetitive type placements, for example, milk testing. Often these students struggle with writing a report as interesting, in depth and as captivating as those who have a research based placement. Some anecdotal evidence suggests that is why some faculty feel the pass/fail grade is the only possible solution.

On the other hand, some faculty feel that it is part of their academic responsibility to be analytical and thoroughly examine student reports and treat their input as a teaching opportunity. It is likely that these faculty members also view a simple pass/fail as an easy way out and an abdication of their professional responsibilities and skills. It is also thought by some faculty that pass/fail does not recognize or encourage effort, prowess, or excellence.

Typically when students submit reports for on-campus courses, a grade is given without any feedback to indicate where the student could improve their report quality. Therefore, no opportunity is being provided, nor does it overtly encourage the student to understand and learn how they could improve the report and their writing ability. That faculty support the current hand-in system (like that for theses and dissertations) and also value the teaching opportunity of giving feedback on placement reports indicate that faculty clearly see their teaching roles being used in this process, and their input is not a poor use of their time as expressed by a faculty member. "Assessment of coop reports is a poor use of my time? Not if I consider it a 'learning' experience for the student. Where else do they go to practice writing reports that have some meaning?"

Problems associated with time allocation requirements for grading placement reports are often magnified for faculty because draft reports are due during the first two weeks of the first semester, a time when faculty are often pressured with new students, lecture preparations and a new teaching load; as expressed by one faculty member: "The problem with placement reports for me - both editing and marking - is that it happens at the busiest time of my year and it therefore adds considerably to the stress." Potentially this could have an impact on how much time can be allocated for editing and feedback, and may influence how much useful feedback is given to the student. Some faculty meet with students to discuss the report and give feedback, but many simply return the report via email or mail without further explanation to go with the feedback.

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

Faculty seem to be potentially supportive of a multifaceted approach to placement assessment, which may mean other assessment approaches, such as oral presentations, could be explored to best assess some of the technical and non-technical skills. This in turn, may allow for a reduction in placement report requirements, and therefore, enable less time commitment for editing and grading of placement reports during busy and demanding times of the year, and it may also be possible to bring greater focus to assessment of non-technical skills by staff other than academic faculty.

The issue of detachment of faculty from the placement work is likely to be more difficult to address, but will provide areas for future research in order to improve faculty interactions with industry and students. Improved communication between the Cooperative Education Unit regarding the success of students as well as the increased learning by co-op students would be worthwhile so that faculty see the link between their input and student learning. While recognizing faculty input as teaching via report editing and feedback, faculty need to be more aware of the importance of non-technical skills such as

writing skills, in both graduate research and employment arenas. Future research will include deeper investigation into faculty views by way of face-to-face interviews and explore the development of possible changes in assessment methods.

The results of the survey suggest that the current grading system is adequate, but it will be worthwhile exploring this area further in the interview process.

REFERENCES

Boud, D., & Falchikov, N. (2005). Redesigning assessment for learning beyond higher education: Melbourne: Higher Education Research HERDSA.

Boumer, G. D. (1996). The research process. Melbourne: Oxford University Press.

Canale, R., & Duwart, E. (1999). Internet based reflective learning for cooperative education students during co-op work periods. Journal of Cooperative Education, 34(2), 25-34.

Cohen, L., Manion, L., Morrison K. (2000). Research methods in education. London: Routledge Falmer.

Coll, R.K., Taylor, N., & Grainger, S. (2002). Assessment of work based learning: Some lessons from the teaching profession. Asia-Pacific Journal of Cooperative Education, 3(2), 5-12.

Hinett, K., & Knight, P. (1996). Quality and assessment. Quality Assurance in Education, 4(3), 3-10.

McCurdy, S. M., Zegwaard, K.E., & J. Dalgety. (2005, June). The impact of students perceptions of the labour market on enrolling in postgraduate study. Paper presented at the 14th world conference on Cooperative Education. Boston.

Wenger, E. (1998). Communities of practice. Cambridge, UK: Cambridge University Press.

Wertsch, J.V. (1991). A sociocultural approach to socially shared cognition. In L. Resnick, J. M. Levine & S. Teasley (Eds.), Perspectives on socially shared cognition (pp. 85-100): Boston: American Psychological Association.

Zegwaard, K.E., Coll, R.K., & Hodges, D. (2003). Assessment of workplace learning: A framework. Asia-Pacific Journal of Cooperative Education, 4(1), 10-18.

APPENDIX

Faculty responses to survey questions about the assessment of co-op to students (n=76)

Questions	Disagree (%)	Ambivalent /undecided (%)	Agree (%)
Co-op Placement s are adequately assessed by written reports	56	27	17
Employer input for a placement is unnecessary	82	11	7
Co-op students should have input into the assessment process of placements (i.e. students self assessment)	30	37	34
Oral presentations would be a useful addition to written reports for placement assessment	20	18	62
Oral presentations would be a useful alternative to written reports for placement assessment.	68	14	19
It is unnecessary to have the co-op placement reports assessed by a specialist in the field of study.	51	21	28
Co-op placements should be assessed using the full academic range (i.e. A+ to F) rather than just pass/fail.	25	15	59
The use of 'draft-to-final' hand-in of placement reports is a valuable teaching opportunity for faculty.	10	27	63
Students learn very little from the feedback for their written reports.	45	42	13
Assessment of co-op placement reports is a poor use of my time.	50	33	17

Value of work placements for students and its influence on student performance: faculty perceptions

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INTRODUCTION

Cooperative education fundamentally relies on the three primary stake holders; employers, students and educational institutions. A common focal point of co-op research has been the benefits for the students and employers, however, with only a few exceptions, educational institutes are often overlooked within this triangulate relationship. In New Zealand, co-op programs are almost entirely driven and administered by the educational institutions, therefore, implementation of work placements in study programs, and acceptance of co-op programs within institutions, is heavily influenced by its own faculty. The value of work placements is well know to co-op practitioners, however, there is evidence that faculty are unsure what value co-op could bring to their institutions and for them individually (McCurdy et al., 2007). Literature suggests that faculty tends to hold rather diverse general views for co-op, where some may are supportive whilst others tend towards antagonistic (Heinemann, 1988; Sovilla & Varty, 2004; Van Gyn et al., 1997). In part this may be because the link between academic outcomes and enhanced performance with undertaking work placements is not well understood or explored. Gomez et al. (2004), for example, found that work placement enhanced biology students academic performance by 4%, however, Duignan (2003) suggests that links between work placements and academic performance does not always exist and perhaps is a product of the co-op program structure. The uncertainty also appears to manifest for faculty perceptions on how work placements could prepare students for graduate studies (Zegwaard et al., 2007).

The paper presented here will not explore the direct link between work placements and academic performance, however, it will explore faculty perceptions of such a link. Given some faculty uncertainty of the value of co-op to university and preparation of students for graduate studies has already been identified, there is some importance to understand faculty views to a greater depth.

CONTEXT

The research was carried out on faculty in the School of Science and Engineering and the School of Computer and Mathematical Sciences at the University of Waikato. Both schools have a long history of offering co-op programs through the Cooperative Education Unit (Laslett & Zegwaard, 2004). The co-op unit facilitates and manages the work placements, whilst faculty involvement is limited to grading placement reports and on occasions offering expertise advice on technical issues during the placement (Coll, 1996).

METHODS

A survey instrument was used and posted using internal mailing systems to all academic staff at the schools of Science and Engineering, and Computer Science and Mathematics. The survey was completed anonymously, however, a confidential numbering system was used to ensure the second mail out was only sent out, by way of third party, to those who did not respond to the first mail out. The survey instrument contained 60 questions of which 19 were relevant to the scope of this paper. There was a prompt at the end of the survey for general open ended comments. Response rate was 54% (n=76). Data were analyzed using standard statistical methods in Microsoft Excel. The data presented are Likert data (ordinal data, not continual data), however, statistical analysis using means and standard deviations like that of continual data was carried out to allow for easy descriptive overviews.

FINDINGS

In general, faculty views indicate recognition of some benefits of work placements for students and subsequent academic performance (see appendix). Statistical variation of the results had a normal distribution pattern with a relatively consistent spread within results. There was some evidence of a small group of participants that consistently took a negative view on the benefits of work placements.

Key findings were that about 80% of faculty thought student learnt both hard and soft skills whilst on placement (means 3.90, 3.96 respectively) and a further 88% thought that student learnt skills on placement not taught at university (mean 4.05), with the remainder being unsure or undecided. However, when asked if student learnt 'scientific skills' on placement, the majority of faculty were unsure with the remainder being split with 33% agreeing and 19% disagreeing. Likewise, faculty seemed unsure if students learnt computer literacy during their work placements, with 46% being unsure, 28% agreeing and 27% disagreeing. Most faculty viewed work placements develop students' work ethic (mean 3.82) and a further 77% thought placements develop communication skills. However, about 50% of faculty were unsure if work placement help students understand academic content or if student reflect back on their experience during courses and practical. Despite having some positive views in regards to learning new skills, 71% of faculty thought that work placement should not be a compulsory part of all science degrees.

DISCUSSION

Are Students Learning Useful Skills During Work Placements?

It is interesting that faculty perceived that both hard and soft skills were learnt by students during work placements but that they were unsure if 'scientific research skills' skills were learnt. It is possible that faculty have in mind a set of skills, or perhaps the context in which they would be applied or learnt, that they do not see as part of the 'generic' hard or soft skills. One participant's comment suggests that perhaps faculty sees scientific skills as subset from technical skills "some students learn important technical skills whilst others learn no new technical *scientific* skills at all" (emphasis added). Past research has shown that science faculty tend to favor hard skills more than soft skills (with the exception of 'ability and willingness to learn'), with particular emphasis on communication, information seeking, and technical skills (Zegwaard & Hodges, 2003), explaining perhaps why faculty are seeking greater distinction within the technical (hard) skills set. Findings of this research indicate that faculty were split on the view that students learn computer literacy during this placement, despite the common usage of computers by student during placements for work purposes and report writing. Again, faculty may be making distinction between what they view as higher (or "scientific") IT-use such as mass spectrometry, and generic computer usage, such as work processing.

Academic Performance Criteria for Acceptance into Work Placement Papers

Faculty seem to hold a complex view when considering academic performance criteria for acceptance into the co-op program. The majority of faculty thought there should be a minimal grade requirement for acceptance into work placement papers, but were split on the view that only students with high grades are suitable for work placements. Likely, there are two conflicting views being considered; 1) representation of the university by students and 2) possible loss of student to industry instead of them undertaking than graduate studies. Faculty believe it is important that 'quality' students should be allowed into the co-op program to best represent our university in industry, for example see comments from one participant: "I do not think we should let 'weak' students into the program. Got to have happy employers." On the other hand, faculty will also be considering a prevalent, but unfounded, view that academically strong students are being scoped up by employers after work placements rather than these students undertaking further graduate studies (see Zegwaard et al., 2007 for further discussion of this view). Perhaps as a subset of the later view, comments made suggest that some faculty appear to distinguish between "professional and career orientated degrees," and "traditional academic degrees," where for the later work experience would be "*largely irrelevant and possibly counter productive*" (original emphasis) and for the former work placements would be "very positive."

Reflection of Work Experience and Enhanced Academic Performance

An important part of learning is the ability to reflect back on past experiences to assist with future situations (Schön, 1983). When students are faced with a classroom situation where placement experiences have some relevance, applying that past experience to current situations is, therefore, an important recognition that learning has taken place (Bandura, 1995). Even though some faculty thought students did draw on their work experience in classroom or practical settings, the majority of faculty

were unsure if this occurs. The reason for this uncertainty could be that some courses will more likely cause student to *noticeable* (i.e. verbally or by writing) draw from their past placement experience than other courses. Compounding this, there is no formal mechanism in place that would facilitate students to draw on past placement experience to answer questions or help solve practical classroom tasks. However, faculty would only have recognized such reflection on work placements if it had occurred in an obvious and recognizable way when likely student reflections could be occurring internally or even subconsciously. The literature mentions instances where co-op students have measurably performed better academically than those without work experience (Gomez et al., 2004; Mandilaras, 2003), where the positive effect were caused by the sum of a diverse list of attributes enhanced during placement (e.g., new skills gained, career focus, work ethic, etc.). However, faculty did not perceive that such a difference occurred between co-op and non co-op students and tended to perceive that co-op students obtain similar grades for on-campus papers than non-co-op students.

Is There More to Work Placements Than Experience?

The uncertainty amongst faculty about work experience being part of the formal educational strategy may be an indication that faculty struggles to recognize differences between 'experience' and 'experiential learning', where the former is unstructured and educational outcomes are relatively random whilst the later is structured with mentorship and educational outcomes are deliberate (Garrick, 1998). Certainly some faculty hold the view that employers take students as a form of easy labor: "Employers see undergrad students as cheap labor and get them to do odd jobs. I am doubtful that employers see the placement as actual experience." It is likely that such view will limited what learning scope faculty see from work placements and probably an explanation why faculty do not see it as important (i.e., compulsory) to have all student undertake work experience. Perhaps the confusion between 'experience' and 'experiential learning' is not helped by co-op literature and publicity material, which often use terms such as 'work experience' and 'gaining experience' but avoids terms such as 'experiential learning'. Whatever the cause, the majority of faculty does appear to be (generally) supportive of work placements, presume some learning does taking place during work placements, but are unsure if the learning fulfils skills requirements (i.e., scientific skills), and do not see work experience as essential.

CONCLUSIONS AND FURTHER RESEARCH

The majority of faculty perceived that student learnt hard and soft skills, and also skills not taught at university, from work placements, however, were unsure if 'scientific research' skills were learnt, implying that this is perhaps a separate subset of skills. Faculty also believed it was important to have minimum grade entry requirements for work placement papers but simultaneously hold the view that perhaps it is better for academically strong students not to undertake work placements.

For co-op practitioners, there is perhaps no greater issue than the effectiveness of a co-op program as an educational strategy for teaching students. To date, this issue has not been greatly understood by both co-op practioners and faculty in general. Findings of this research suggests that faculty also holds some uncertainty on how, or if, work placements fit well within the overall educational strategy for tertiary education degrees. Faculty generally perceive that work placements do give some benefits (e.g., enhancing and learning new skills) for students and their academic performance, however, appear to be unsure what these skills are and if students then draw upon those skills and experiences in other courses. The uncertainty may perhaps be compounded by the view that work placements merely be offer an 'experience' rather than recognizing it as a form of 'experiential learning'.

There is need for further research, by way of face-to-face interviews, to better understand the rationale behind faculty perceptions and perhaps uncover unfounded or erroneous perceptions that could be addressed through an institutional intervention (e.g., training structures). The research has also uncovered a need to further explore what faculty perceives as 'scientific' skills and how they differ from already identified skills from past research. In addition, there may be a need explore a mechanism to address how learning from placements could be structured back into other courses and to concentrate the focus on the learning obtained from placements rather than seeing placements merely as a practical experience.

REFERENCES

Bandura, E. (1995). Self-efficacy in changing societies. Cambridge, MA: Cambridge University Press.

Coll, R.K. (1996). The BSc(Technology) degree: Responding to the challenges of the education marketplace. Journal of Cooperative Education, 32(1), 29-35.

Duignan, J. (2003). Placement and adding value to the academic performance of undergraduates: Reconfiguring the architecture - an empirical investigation. Journal of Vocational Education and Training, 55(3), 335-350.

Garrick, J. (1998). Informal learning in corporate workplaces. Human Resource Development Quarterly, 9(2), 129-144.

Gomez, S., Lush, D., & Clements, M. (2004). Work placements enhance the academic performance of bioscience undergraduates. Journal of Vocational Education and Training, 56(3), 373-385.

Heinemann, H. (1988). Cooperative education and the academy. Journal of Cooperative Education, 24(2-3), 109-119.

Laslett, R.L., & Zegwaard, K.E. (2004). Cooperative education in science and technology. In R.K. Coll & C. Eames (Eds.), International handbook for cooperative education (pp. 85-99). Boston: World Association for Cooperative Education.

Mandilaras, A. (2003). Industrial placement and degree performance: Evidence from a British higher institution. International Review of Education Economics, 3(1), 39-51.

McCurdy, S., Zegwaard, K.E., & Lay, M. (2007). Academic voices Part II: What are faculty saying about cooperative education? In R.K. Coll (Ed.), Proceedings of the 10th Annual New Zealand Conference on Cooperative Education (pp. 67-71). Rotorua, New Zealand: New Zealand Association for Cooperative Education.

Schön, D.A. (1983). The reflective practitioner: How professionals think in action. New York: Basic Books.

Sovilla, E.S., & Varty, J.W. (2004). Cooperative education in the USA, past and present: Some lessons learned. In R. K. Coll & C. Eames (Eds.), International handbook for cooperative education (pp. 3-16). Boston: World Association for Cooperative Education.

Van Gyn, G., Cutt, J., Loken, M., & Ricks, F. (1997). Investigating the educational benefits of cooperative education: A longitudinal study. Journal of Cooperative Education, 32(2), 70-85.

Zegwaard, K.E., & Hodges, D. (2003). Science and technology stakeholders' ranking of graduate competencies Part 4: Faculty perspective. Asia-Pacific Journal of Cooperative Education, 4(2), 23-35.

Zegwaard, K.E., McCurdy, S., & Paku, L. (2007). Faculty views on the influence of work placements on students' ability to do science graduate studies. In R.K. Coll (Ed.), Proceedings of the 10th Annual New Zealand Conference on Cooperative Education (pp. 23-28). Rotorua, New Zealand: New Zealand Association for Cooperative Education.

APPENDIX
Faculty responses about the value of work placements for students (5 point Likert scale, n=76)

	Strongly Disagree (Likert 1) (%)	Disagree (Likert2) (%)	Unsure/ Undecided (Likert3) (%)	Agree (Likert4) (%)	Strongly Agree (Likert5) (%)	Estimated Mean	Standard Deviation
Co-op students learn 'hard skills' (practical skills) while on placements.	1	4	14	64	16	3.90	0.77
Co-op students learn 'soft skills' (e.g. relationship building) while on placements.	0	3	15	66	16	3.96	0.66
Co-op students do not learn much in the way of skills while on placements.	25	53	15	5	1	2.05	0.86
Co-op students learn a "work ethic" from a placement.	0	3	21	68	8	3.82	0.61
Co-op placements enable students to learn skills that are not taught at university.	0	0	12	70	18	4.05	0.55
Co-op placements develop students' personal communication skills.	0	4	19	67	10	3.82	0.65
A co-op placement should be a compulsory part of all science degrees.	29	42	18	8	3	2.14	1.02
Co-op placements and placement reports enable students to learn writing skills.	1	11	16	63	8	3.66	0.84
Co-op placements help develop useful skills for students going on to graduate studies.	1	11	36	48	4	3.42	0.80
Co-op students learn scientific research skills whilst on placement.	4	25	38	33	0	3.00	0.87
Co-op placements help students focus their career paths.	0	10	32	55	4	3.53	0.73
Co-op placements help students understand academic content from taught courses.	3	13	43	42	0	3.21	0.78
Co-op students are more computer (I.T.) literate after a placement.	3	24	46	28	0	2.99	0.80
After placements co-op students contribute more in tutorials and practicals.	9	19	57	16	0	2.80	0.81
Co-op students use placement experiences as examples in tutorials and practicals.	6	10	59	26	0	3.04	0.77
Co-op degrees should have a minimum entry level requirement based on grades from on-campus taught courses.	1	8	25	51	14	3.68	0.87
Students with higher grades for on-campus taught courses are most suitable for co-op.	1	22	39	33	4	3.17	0.87
The academic undergraduate grades for on-campus taught courses are similar for co-op and non-co-op students.	3	9	54	28	6	3.25	0.82
Non co-op students generally achieve higher grades in their on-campus taught courses during their undergraduate degrees.	8	27	61	5	0	2.62	0.70

Using practice based learning at a dual-sector tertiary institution: a discussion of current practice

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INTRODUCTION

Practice based learning or co-operative learning are terms that are commonly used to describe the form of learning that integrates learning in the classroom with some form of productive work experience in the workplace.

The practice based learning style of delivery has become a key component particularly in undergraduate degrees of connecting the learning that occurs at the institution to the learning at the workplace. Traditional models of cooperative education programs in engineering and technology usually have work placement component of six to twelve months duration. Industry placements have been used as alternative methods of learning options with some tertiary education providers for some time linking education programs to a real work environment, and generally the two main objectives of industry placements are for:

- – students to gain hands on work experience; or
- – students to earn academic credits within an academic program

The first type as work experience only is usually set up at the end of or during an academic program. Students are sent to work placement and no academic assessment is required because the work experience is additional to the academic program. The second type is part of academic programs and students earn academic credits from the work placement. This type of placement is well used in certificate level courses and in particular at trade type courses where "On the Job" assessment is achieved as students work towards achieving competency standards in a particular discipline.

An alternative method of practice based learning used is where specific courses are designed to enable project based learning in conjunction with industry such as. courses delivered in the Bachelor of Applied Technology (Electro-technology) at Unitec Applied Technology Institute, are directly linked to industry through focusing on industrial products where the design for teaching and learning is through a project based philosophy. Instead of traditional work practices, students will focus on approved research topics with a technology and industry project and complete their projects through working in conjunction with industry (Qi & Cannan, 2004).

In comparison with the higher level delivery models of 'practice based learning' there are other significant models of delivery utilized when vocational and technical courses are delivered within a 'dual sector' tertiary environment. In particular for apprenticeship/trainee style learning workplace learning is conducted and assessed at the workplace and students carry out full time work and study on a part time basis to complete their qualification. This form of 'on job' and 'of job' learning requires a significant different approach in terms of learning and assessment and the alternative methods of applying practice based learning across the different student cohorts. Students that articulate into higher level learning from their certificate courses have most likely experienced practice based learning in some form whilst studying within the dual sector institution and will have a clear understanding of actual requirements needed within the workplace.

This paper presents a review of reported practice based learning within vocational and technical education particularly with project based learning in a full time program and on job and off job learning of trainees employed full time and studying part time.

BACKGROUND LITERATURE

Practice based learning has been effective in developing partnerships and connecting the learning institutions with Industry and forming the curriculum into a meaningful process of learning. Students have been sent to work placement to combine their academic capabilities with their practical skills to secure future work prospects. As indicated by Lewis and Durcharme (1990) if the gap can be narrowed

between what the student learns in an educational institution to the learning that is experienced at the workplace then part of the challenge for educationalists and for industry to work closer together may well be met through such processes as work integrated learning and co-operative learning programs

There are numerous examples of PBL or co-operative education programs across the world and New Zealand is fast becoming a country where this form of learning is becoming more popular and the benefits of PBL are being recognized. Providers delivering engineering programs within New Zealand such as Unitec New Zealand's Bachelor of Engineering (Unitc, 2004), Manukau Institute of Technology's Electronic Engineering (Manukau Institute of Technology, 2006), The University of Waikato's work placements in engineering and Science (University of Waikato, 2006), all provide the more traditional models of co-operative education programs in engineering and technology. Reports in the literature predominately indicate a requirement of 6 to 12 months of work placements. For example, at Unitec the Bachelor of Engineering students are required to complete 800 hours of work experience as this is the standard requirement of the Institute of Professional Engineers New Zealand (IPENZ). The work experience component can be completed alongside the academic requirements prior to graduation whether by studying full time or part time.

PBL: Degree Level Industry Projects

In New Zealand where PBL is carried out in the higher level degrees through industry projects, they generally tend to be structured as part of the work placement where a formal Memorandum of Understanding (MoU) is based around a 'work-integrated learning' category where there is an academic component of the course that is required to be assessed at the workplace. As part of the MoU there are clear guidelines in the form of a learning agreement that all three parties the student, employer and learning provider agree to, ensuring that the academic requirements are met maximizing the students learning opportunities at the workplace (Unitec, 2006).

Unitec New Zealand offer programs that include work placements that require project work to be completed as practice based learning such as in the Bachelor of Business where the industry project consists of 18 credits and the Bachelor of Computing requires an industry project of 36 credits. The Bachelor of Applied Technology (Electrotechnology) has an industry project of 60 credits value. Academic supervision is provided for all of these programs and the assessment consists of a project report and employers' evaluation report.   Students need to demonstrate effective personal, interpersonal and intellectual competency in the completion of a project and to critically reflect upon the process undertaken in completing a work-based project. Students will also are required to demonstrate to industry and their supervisor in the form of a formal presentation in the Bachelor of Applied Technology their project topic.

Workplace Learning

Workplace learning research has brought about a great deal of learning perspectives and different points of view from various researchers. New technology and increased competition between organizations at a national level and globally has led to a renewed interest by stakeholders to re-evaluate the training and educational needs of the workforce. Workplace learning is becoming an important feature and employee's skills and vocational knowledge has to be improved through positive workplace education and training. This is now an important issue particularly in the context of PBL where students on work placements spend a great deal of time in the workplace and the work carried out in the workplace has to complement the educational requirements of the curriculum.

Workplace learning has been defined in several ways and Boud and Garrick (1999, p. 2) indicated there should not be just one definition … "many perspectives are needed not only because of the diversity of work and the differences which exist even within a single organization but because learning in the workplace is so multifaceted." Workplace learning or on-the-job learning as it is also known in New Zealand has attracted a great deal of interest and substantial research has taken place around learning opportunities in the workplace and the workplace is viewed as having a number of roles in learning. Marsick (1987) gave a broad definition of workplace learning as:

The way, in which individuals or groups acquire, interpret, reorganize, change or assimilate a related cluster of information, skills and feeling. It is also primary to the way in which people construct meaning in their personal and shared organizational lives. (Marsick 1987, p. 4)

In later work, Marsick identified three primary categories as learning opportunities which are listed as formal, informal, and incidental. The formal learning opportunities are normally provided in a structural way in a classroom-based activity suitable for learning, that involve a teacher and a group of learners usually known as a course, seminar or conference either in-house or at another venue located away from the workplace. Informal learning is not deemed to be an ad hoc process; rather, there is an interrelationship between informal learning and work. The informal learning refers to the learning experiences that occur naturally as part of the work and learning can be incorporated within the work by, for example, by providing employees with a variety of tasks, or by arranging the work in a manner which maximizes learning opportunities. Informal learning may include on the job learning, performance planning, coaching and self-study by reading journals and manuals, and potentially all structured activities that lead to learning. (Marsick & Watkins, 1990, 1999).

Incidental learning as defined by, Marsick and Watkins (1990) identified 'incidental learning' as a subset of informal learning where learning opportunities occur, have not been planned but occur spontaneously as a by-product of opportunities to work with new or challenging projects with expert professionals or with knowledgeable peers. Ross-Gordon and Dowling (1995, p. 315) provide a definition of incidental learning as:

Spontaneous action or transaction, the intention of which is task accomplishment, but which serendipitously increases particular knowledge, skills, or understanding. Incidental learning is unintentional and unexamined. It is not based on reflection; thus the learning is embedded in the learner's actions.

Workplace learning is defined by Skill New Zealand (2001) as the formal acquisition of skills and knowledge in the workplace. It can be 'employer based', where the learner is an employee working and learning while at their place of work, or 'work-based', where someone who is not an employee of the company comes into that company's workplace for the purpose of training. Knowledge and skills obtained in the workplace are formalized with assessment and the achievement of a national qualification. Workplace learning may be supported by off-site education and training on a regular or occasional basis. (Skill New Zealand, 2001)

Industrial-oriented Teaching and Learning

Industrial oriented teaching and learning is an approach to learning from an industry perspective and throughout the program the learning methodology incorporates a form of project based learning. This is particularly the case when viewing the program developed for the Unitec Bachelor in Applied Technology (Electro-technology). This program is different from traditional technical Bachelor degrees as the approach to learning is from an industry perspective. The program in the Applied Technology (Electro-technology) bachelor's degree is specifically focused on practice and is a creative, purposeful activity in which ideas and techniques are used for developing or modifying products, systems or environments. Knowledge and skills are combined with available resources to help solve defined, practical problems. The problem-management that lies at the heart of applied technology is specialized, disciplined and systematic. (Qi & Cannan, 2004)

Bachelor in Applied Technology

In the first two years of the program students specialize in one technical area and acquire a set of technical knowledge, skill and capability using the strategies described above to solve practical problems in an applied mode. The final year is wholly focused on integration and application where students will work on their industry project in co-operation with industry working at the workplace through a practice based work plan. The premise that technological practice takes place within, and is influenced by, social and cultural contexts underpins the authenticity of the industry project. This project requires students to manage the innovative and informed use of specialized technical and social knowledge to achieve commercial and/or social objectives.

Graduates will, therefore, acquire the generic skills needed for achieving technological progress, economic growth and well-being, and will have specialized technical skills, as well as entrepreneurial

and management skills to meet the constantly changing technological environment they work and live in. They will also be aware of themselves and the contexts in which they live and work, and of the need for a commitment to life-long learning (Qi & Cannan, 2006b).

On Job, Of Job Learning

Within the trades and technology area there is an increasing number of employees and trainees involved in workplace learning. This is carried out in various forms and the need for structured practice based learning is clearly required to ensure that the quality of the education and learning is paramount. Industry training organizations (ITO's) have been given the task of producing qualifications made up of unit standards and the integration of the learning packages are conducted through the delivery of learning at the workplace and also at the tertiary institution. At Unitec in the Applied Technology Institute Practice Based Learning programs have been developed to enable this form of learning to occur.

There is a tendency from the ITO's to recommend that all trainees should be employed prior to any training program to be commenced and once employed then to sign up into a training agreement to carry out training. Within the Electro-technology industry the qualifications have been designed to incorporate training that is required to be undertaken at the workplace (i.e., on job learning) and for the theoretical and practical underpinning to be carried out through a learning program at a tertiary provider (i.e., of job learning). At Unitec in the Applied Technology Institute we cover a wide range of trade and technical training and in most of the discipline areas some form of learning and training package has been developed to allow for this style of practice based learning to occur. When the students are employed at the workplace the practical component of the unit is carried out there. The practical part of the unit standard is practiced until the student is deemed competent and once the student has reached that stage the practical assessment is ready to be conducted. To ensure that quality control is provided for there is a rigorous process in place to ensure that the assessor at the workplace has the skills to enable the assessment to be completed and that the academic supervisor can verify that the assessment is valid. Once the assessments at the workplace have been completed it is up to the supervisor to record the unit standard achievement and to inform the National Qualification Authority (NZQA).

For students that are not employed and are carrying out training towards their National qualifications, a similar process of learning can be achieved through on job learning and off job learning and all the units of learning count towards the national qualification. For students that attend pre-industry courses such as the Certificate in Applied Technology the courses that they complete of job count towards the credit requirements only and when they carry out their work experience as PBL there are no credits or practical assessments achieved. The main advantage for this method of PBL is for students to become familiar with work activity at the workplace and gain an on job experience prior to gaining employment.

DISCUSSION

This paper presents a review of reported practice based learning within vocational and technical education across a dual sector institution. The two alternative types of PBL that have been identified here have been from both ends of the academic spectrum giving aspects of current models used and linkages between the curriculum and the workplace. They are operated in very different ways; however both types of PBL impact on students in a similar way where the workplace learning is integrated with classroom studies allowing practice to be integrated with theory. At the undergraduate level PBL delivered through the industrial oriented teaching and learning model poses several advantages as indicated in previous work (Qi & Cannan, 2005). Students gain a strong affiliation with their lecturers allowing for a greater ability to meet the employers' requirements for employment. Academic staff members will also enhance their credibility from industry through the increased relationship with industry practitioners where partnerships formed will strengthen research and development links with industry.

Academic staff can be encouraged to engage in industry orientated research alongside their students. For instance while students were sent to industry to work on their industry projects, lecturers worked as

direct supervisors on the projects and in fact acted as a member of the project team. The final year in the Bachelor degree is wholly focused on integration and application where students will work on their industry project in co-operation with industry. The industry project requires students to manage the innovative and informed use of specialized technical and social knowledge to achieve commercial and/or social objectives.

For students engaged in certificate courses and employed at the workplace they are able to progress through their academic program whilst carrying out authentic work and complete their required assessments. The of job requirements are closely linked through the learning package and provide for an integrated approach for learning and working. Also with this form of PBL academic staff who act as supervisors within the workplace gain clear insights as to the requirements of the workplace which is essential with ever changing technology and new knowledge.

IMPLICATIONS/CONCLUSIONS

The models identified and used are clearly different and will have an impact as to how students learning will be perceived at both the institution and at the workplace. Evaluation of the different methods identified clearly indicates a need for a different approach to the delivery of practice based learning depending on how the students are engaged in the delivery of programs, and a need for further research is necessary to determine the extent of benefits gained in the use of this form of learning at a dual sector institution

REFERENCES

Garrick D. &, J. (1999), Understandings of workplace learning. In D. Boud & J. Garrick (Eds.), Understanding learning at work (pp. 1-2). London: Routledge.

Lewis, D., & Durcharme, R. (1990). The education of business undergraduates: A gap in academic/practitioner expectations? Journal of Education for Business, November/December, 116-120.

Manukau Institute of Technology: Electronic Engineering. (2006). Retrieved 09 Mar, 2008,   from http://www.manukau.ac.nz/departments/e_e/courses/BEngTech/BETelectronic.asp

Marsick, V. (Ed.). (1987), Learning in the workplace. London: Croom Helm.

Marsick, V.J., & Watkins, (1990). Informal and incidental learning in the workplace. London: Routledge.

Marsick, V.J., & Watkins, (1999). Facilitating Learning Organizations; Making Learning count, Gower, Aldershot.

Ross-Gordon, J.M., & Dowling, W.D. (1995). Adult Learning in the context of African-American woman's voluntary organizations. International Journal of Lifelong Education 14(4), 306-319.

Skill New Zealand. (2001). Knowledge at work-Matauranga i te Wahi Mahi. In R. Curson (2004), Completion Issues in Industry Training and Effective Learning in the Workplace. Industry Training Federation.

Qi, Z., & Cannan, J. (2004). Industrial oriented teaching and learning strategies. Paper presented at the 5th Asia Pacific Cooperative Education Conference, Auckland, New Zealand.

Qi, T., & Cannan, J. (2005, July) Industrial oriented teaching and learning strategies in the Bachelor of Applied Technology (Electrotechnology). Paper presented at the 14th World Conference on Cooperative education. Boston, USA.

Qi, Z., & Cannan, J. (2006). Student/Industry Project in Industrial Oriented Undergraduate Degree in Electro-technology. Paper presented at the Conference Proceedings: New Zealand Association for Cooperative Education Annual Conference, Queenstown. http://www.nzace.ac.nz/past_conf_proc.htm

Unitec. (2003). Bachelor of Applied Technology Part A: The Programme, Unitec New Zealand.

Unitec.   (2004).   Bachelor   of   Engineering.   Retrieved   4   April   2008,   from http//unitec.ac.nz/programmes/engineering.html

University of Waikato. (2005). Bachelor of Engineering with Honours (BE(Hons). Retrieved 10 Mar, 2008, from http://calendar.waikato.ac.nz/regulations/bachelor/behons.html

University   of   Waikato.   (2006).   Work   placements   overview.   Retrieved   10   Mar,   2008,   from http://sci.waikato.ac.nz/student_info/work_placements/overview.shtml

Critical thinking and reflection in cooperative education

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INTRODUCTION AND BACKGROUND

At the 2007 NZACE conference, Claxton and Hoskyn presented a paper entitled 'Distance Learning and Teaching in Cooperative Education', which subsequently initiated discussion about different models of critical thinking and reflection. This analogous paper discusses some models of reflection and critical thinking and their application in co-op programs. The use of models to differing disciplines or subject areas is discussed with reflection on the extent to which models of critical thinking are discipline- or subject- specific. This paper covers only critical thinking and reflective models rather than instructional approaches that could be used. It could be used to assist cooperative education programs in the selection and utilization of some models, or a discrete model.

ISSUE

Reflection and critical thinking are commonly used in cooperative education and work-based learning programs to ensure that students gain the maximum benefit from their work placement and co-op experience. Investigation of the relationship between theory and practice is a major component of cooperative education. When students are putting into practice their learned knowledge, away from their place of education, it is essential that the learning programs are structured to ensure that students gain the maximum benefit from their work placement and co-operative education experience. Students do not naturally engage in this process (reflection) so it is essential to provide guidance and some form of structure. There is discussion in the literature regarding the extent to which this guidance or structure is discipline- or subject-specific.

DISCUSSION

The following table provides a depiction of categories of models, a few examples of each, with the provision of fields in which this model has been reported in literature, and key components for each type of model. It must be noted that the authors' main area of experience is in the area of business. Comments about the use for other fields of study are based on literature review and anecdotal discussion with other academics.

The grouping of models in Table 1 is largely based on the purpose and process for thinking. It almost forms a continuum from the highly structured research- or evidence-based models which have formalized process to the more flexible creative models, with reflection on practice being partway between the two. There are fewer variations within the research-based and problem-solving models than within the other categories. The final category of models does not offer a process but focuses on characteristics or components of thinking. The name for this category of 'a lived activity' was used by Brookfield to demonstrate that thinking can be a feature of every aspect of life rather than just an academic activity. This category focuses more on the thinker (the person) than the process. Baillin, Case, Coombes & Daniels (1999) emphasize that it is the quality of the thinking that is more important that the quality of the processes and that this is related to the characteristics of the thinker.

The categorization is not completely mutually exclusive. A thinker can use two models in tandem or can use one framework within another. For example the concepts found in the 'lived activity category' or analysis of argument/understanding of issues can be part of any stages of the other models. This is particularly important in the early stages of the problem-solving model when the problem is being defined. A concern raised by Chaffee (1990) is that problem definition can be constrained by assumptions, prior knowledge, known limitations. The use of idea generation or some components of the 'lived activity' can help remove these constraints. This is then suggesting that the use of more generic thinking can break down the constraints that knowledge of a specific subject can bring to the thinking process.

TABLE 1.

Models for critical thinking and reflection identified in the literature

Types of models	Some examples	Reported fields of application	Typical components
Research/evidence based	Chaffee (1990)	Science Medicine IT	Based on scientific process of hypothesis, research or testing, analysis of results, conclusions *Consideration is given to statistics, validity and reliability, inferences, causal assumptions.*

Problem-solving	Chaffee(1990)
	Wallace &
	Ennis (1987)
		Hospitality
		Business
		Psychology
		Mathematics
		IT
			Solution-oriented or decision-oriented models often based on John Dewey's model (1910) and include components such as:
			    Problem recognition and definition
			    Search for alternatives/possible solutions
			    Consider the pros and cons and use criteria for making a decision based on available information and goals
			    Identify solution
			    Implement
			    Review effectiveness/reflect on results
			The key consideration is the outcome of the process – whether a solution was found.

Reflection about practice or fieldwork	Boud (2001)
	Schon (1983)
	Bogo & Vayda's ITP Loop (1998)
	Kolb's experiential learning model (Kolb, Rubin & McIntyre 1984)
	Kemmis & McTaggart's Action Research Spiral (cited in Grainger & Taylor, 2004)
	Single-loop and double-loop (cited in Brockbank & McGill,1998)
		Almost all fields but particularly strong
		    Nursing
		    Education
		    Psychology
		    Social sciences
		    Social work
		    Business
			Incident analysis
			Often a cyclical 4-step process such as:
			    Gather information
			    Reflection
			    Link to theory or knowledge
			    Professional Response (Bogo & Vayda, 1998)
			or
			    Concrete experience
			    Observation and reflection
			    Formation of abstract concepts & generalizations
			    Test implications of the above in new situations (Kolb et al, 1984)
			Consideration is given to context and reference to theory

Analysis of argument/understand-ing issues	Facione (cited in Simpson & Courtney, 2002) Alvarno model (cited in Crowe, 1987) Chaffee (1990)	Philosophy Ethics Nursing Philosophy	Identify, analyze, define, judge credibility, make inferences, judge solution Or Interpret, analyze, infer, explain, evaluate

Types of models	Some examples	Reported fields of application	Typical components
Creative/idea generation	Calvin Taylor (cited in Sclichter), De Bono, Paul cited in McMahon(2005).	Advertising and marketing	Elements or principles of critical thinking sometimes with no specific order or process "A combination of knowledge and imagination" Simpson and Courtney, 2002, p94).
"A lived activity" (Brookfield, 1987, p14)	Brookfield (1995) Ennis (1987) Schon (1983) Lipman (cited in Moseley, Baumfeld, Elliott, Gregson, Higgins, Miller and Newton, 1991)	Ethics Philosophy Social sciences	Generally less process- oriented and more focused on components, skills, capabilities and dispositions Mainly focus on higher order thinking from Bloom's Taxonomy (Analysis, synthesis and evaluation) Phases of thinking rather than steps e.g. phases of trigger, appraisal, exploration, develop alternatives, integration. (Brookfield, 1987) *Consideration is give to recognising and challenging assumptions, recognition of different perspectives, exploring alternatives, importance of recognizing role of emotion, the person-specific nature of processes.*

Crow (1987) commented about the tension between subject-specific and general thinking skills. The discipline-specific nature of thinking is discussed by many authors. Some refer to the use of the body of knowledge and the context in which thinking is applied. Brookfield (1995) notes that much of the area in critical reflection is context or domain-specific. Context is more than just the discipline in which the thinker is operating; it can refer to their workplace and the whole culture and time in which they live. (Brookfield, 1987). Ennis (1987) comments that one must understand the background to a situation and expert knowledge may also be required to give appropriate thought. However he also comments that there are generic thinking skills as well.

It is often argued that critical and reflective thinking relates to particular skills such as the ability to weigh evidence, identify erroneous points of view or logically reason (Mason 2007). Further proposals are that these practices are identified in the tendency of the individual to ask searching questions or that these predispositions based on substantial knowledge of specific matter or discipline, however that could then limit the critical thinker to be effective only within matter or discipline (Mason, 2007).

An alternative view was suggested by Ennis (1996) who proposed a conception of critical thinking based mainly specific skills such as evaluation, logic, judgment, observation and similar. Ennis proposed that critical thinking was indicated by the correct assessing of statements, and more generally by the ability of the thinker to reasonably reflect. He maintained that whilst the capabilities associated with critical thinking could be learned of a specific discipline, he believed it could be moved from one field of learning to another. Ennis (1996) proposed that the process of critical thinking is deductive, suggesting that critical thinking involved applying the doctrine associated with critical thinking to a specific discipline.

Paul in McMahon (2005) similarly describes disciplined forms of thinking as the contextualization of critical thinking and discusses how critical thinking can enhance discipline knowledge. Quellmalz (1987) undertook a comparison of thinking processes in science, social science and literature studies and found considerable similarity in the concepts used and the order in which they occurred in a process although the terminology differed. A similarity that is inherent or directly stated in all models is the emphasis on the intentional nature of thinking (Angelo, 1995).

Many models especially the problem-solving and reflective models are depicted diagrammatically as a single and double loop cyclical process (Bogo & Vayda, 1998; Kemmis & McTaggart cited in Grainger & Taylor, 2004; Schön, 1983, cited in Brockbank & McGill, 1998). Once some form of outcome or conclusion is reached this feeds into another process of thinking or results in a modification of practice or a plan and the cycle begins again. This seems to encourage the process of thinking to continue beyond the cooperative education placement and could set up an extended period of critical and reflective thinking or even a habitual practice. A habitual practice in itself could result in some of the problems of limitation described earlier.

Tradition seems to favor the use of reflective practice models in many cooperative education programs. The literature from nursing and education is particularly strong in these areas. The use of problem-solving and reflective practice models relate well to the unique nature of cooperative education as the aspect of academic study undertaken in the work-place. Research projects and analysis of issues are typical components of other academic non-work-based papers. It would therefore be logical to include on different forms of reflection in cooperative education.

Given the range of critical thinking literature with varying models, concepts and suggestions, the choice of which critical thinking or reflective approach to use in any one situation requires a critical thought process in itself.

CONCLUSIONS

Each model has different perspectives and can therefore potentially benefit Co-op programs in particular ways. The context and theory applied to the model are certainly strongly bound to a relevant discipline, however there does not appear to anything inherent in any of the models that restricts their use to any specific discipline. Tradition seems to favor the use of some models in particular areas.

IMPLICATIONS

With such a vast array of literature on the subject of thinking and reflection, it is hoped that this categorization of models can assist co-op practitioners to consider the type of practice best suited to their program or an individual student's situation. This can then enable the practitioner to focus their attention on comparison of models within a specific category.

A question that could be asked by educators: is the model or process that is encouraged potentially limiting the students thinking? Could the students be given choices so that they need to select an appropriate framework? Could they be given concepts and components and asked to form their own model or variation of an existing model?

REFERENCES

Allegretti, C.L., & Frederick, J.N. (1995). A model for thinking critically about ethical issues. Teaching of Psychology, 22(1), 46–48.

Angelo, T.A. (1995). Classroom assessment for critical thinking. Teaching of Psychology, 22 (1), 6–7.

Baillin, S., Case, R., Coombes, J.R., & Daniels, L.B. (1999). Common misconceptions of critical thinking. Journal of Curriculum Studies, Vol 31 no 3, 269-283.

Baillin, S., Case, R., Coombes, J.R., & Daniels, L.B. (1999). Conceptualizing critical thinking. Journal of Curriculum Studies, 31(3), 285-302.

Bogo, M & Vayda, E. (1998). The practice of field instruction in social work: theory and process (2nd ed.). Toronto: University of Toronto.

Boud, D. (2001). Using journal writing to enhance reflective practice. In L.M English & M.A. Gillen (Eds.), Promoting journal writing in adult education: New directions in adult and continuing education (No. 90, pp. 9–18.). San Francisco: Jossey-Bass,

Boud, D., Cohen, R., & Walker, D. (Eds.). (1993). Using experience for learning. Philadelphia, PA: Society for Research into Higher Education & Open University Press.

Boud, D., & Feletti, G. (1997). The challenge of problem-based learning (2nd ed.). London: Kogan Page.

Brockbank, A., & McGill, I. (1998). Facilitating reflective learning in higher education. Philadelphia, PA: Society for Research into Higher Education & Open University Press.

Brookfield, S. (1987). Developing critical thinkers: challenging adults to explore alternative ways of thinking and acting. San Francisco: Jossey-Bass

Brookfield, S. (1995) Adult learning: an overview in A. Tuinjman (Ed.). (1995). International encyclopedia of education. Oxford, UK. Pergamon.

Browne, M.N., & J.L Litwin. (1987). Critical thinking in the sociology classroom: Facilitating movement from vague objective to explicit achievement. Teaching Sociology, 15, 384-391.

Claxton, G., & Hoskyn, K. (2007). Distance learning and teaching in cooperative education. In R.K. Coll (Ed.), Conference Proceedings: New Zealand Association for Cooperative Education Annual Conference (pp. 29-34). Rotorua, New Zealand: NZACE.

Crowe, D. (1987). Development of critical thinking in cooperative education. Unpublished work. Auckland, New Zealand: Auckland Institute of Technology.

De Bono, E. (1999). New thinking for the new millennium. Viking.

Ennis, R. H. (1987). A taxonomy of critical thinking dispositions and abilities. In J.B. Baron & R.J. Stenberg (Eds.). Teaching thinking skills: Theory and practice (pp. 9-16). New York: WH Freeman.

Ennis, R. (1996). Critical thinking. Upper Saddle River, New Jersey, Prentice-Hall

Grainger, S. & Taylor, N. (2004). Cooperative education in teacher education. In R.K. Coll & C. Eames (EDs.), International Handbook for cooperative education: An international perspective of the theory, research and practice of work-integrated learning (pp. 159-167). Boston: World Association for Cooperative Education..

Kolb, D., Rubin, I., & McIntyre, J. (1984). Organizational psychology: An experiential approach to organizational behavior. Englewood Cliffs, NJ: Prentice-Hall.

Mason, M. (2007) Critical thinking and learning. Journal of Educational Philosophy and Theory, 39(4), 339-349.

McMahon, C.M. (Ed.). (2005). Critical thinking: Unfinished business. San Francisco: Jossey-Bass.

Moon, J. (2008). Critical thinking: An exploration of theory and practice. London: Routledge.

Moseley, D., Baumfield, V., Elliott, J., Gregson. M., Higgins, S., Miller, J., & Newton, D. (2005). Frameworks for thinking: A handbook for teaching and learning. Cambridge, UK: Cambridge University Press.

Pektus, E. Jr. (2007). Enhancing the relevance and value of marking curriculum outcomes to a liberal arts education. Journal of Marketing Education, 29(1), 35-51

Pithers, R.T. (2000). Critical thinking in education: A review. Educational Research, 42(3), 237-249.

Quellmalz, E.S. (1987). A Developing reasoning skills. In J.B Baron & R.J. Stenberg (Eds.), Teaching thinking skills: Theory and practice (pp. 86-105). New York: WH Freeman.

Ruggiero, V.R. (1991). Thinking: A guide to critical and creative thought. (3rd ed.). New York: Harper Collins.

Schlichter, C.L. (1986). Talents unlimited: An inservice education model for teaching thinking skills. Gifted Child Quarterly, 30(3), 119-123.

Schön, D.A. (1983). The reflective practitioner: How professionals think in action. New York: Basic Books.

Simpson, E., & Courtney, M. (2002). Critical thinking in nursing education: Literature review. International Journal of Nursing Practice, 8, 89-98.

Underwood, M.K. & Wald, R.L. (1995). Conference-style learning: A method for fostering critical thinking with heart. Teaching of Psychology, 22(1), 17–21.

Maximizing student learning in the workplace: one perspective

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INTRODUCTION AND BACKGROUND

The capabilities that students are typically intended to develop and demonstrate through their participation in a cooperative education program are represented in the following list (sourced, with paraphrasing, from one program).

Students are able to:

- integrate theory and practice;
- engage competently in professional practice(s);
- work independently;
- engage effectively in teamwork;
- interact, and engage, effectively with people in a workplace who have varied backgrounds;
- solve problems that are typical of those that arise in the workplace;
- engage in critical analysis and reflective thinking in relation to workplace critical incidents;
- identify issues (local, national, global) associated with the industry or business;
- communicate appropriately and effectively in oral and written forms; and
- employ research competencies to address questions associated with the organization and work practices.

Personal attributes are also often intended outcomes for programs. For example, initiative and confidence are attributes that this program is intended to foster.

In this paper, I first propose further capabilities that students might develop as an outcome of their workplace learning experiences – and that I have previously helped them acquire. I n the light of a review of recent literature on workplace learning, I then identify new findings and theories concerning workplace learning that suggest that there are other capabilities to consider along with additional implications for curriculum, learning, teaching and assessment associated with cooperative education programs. I conclude by indicating the direction for my future work as a teacher and researcher in this field.

Further capabilities that I have previously addressed with students include:

- distinguish between personal practical knowledge (PPK) and public general knowledge (PGK);
- explain why workplace-based learning is conducive to acquiring and constructing personal practical knowledge;
- plan appropriate and effective strategies for gaining access to the personal practical knowledge of members of a particular workplace – and for evaluating that knowledge; and
- use effective ways of reflecting on workplace experiences to generate personal practical knowledge.

Central to these capabilities is a distinction made between PPK and PGK. This distinction and the associated terms were offered by Butler (1992, 1996). He characterizes personal practical knowledge as:

A store of knowledge and understanding attained through lived experience … This conscious and unconscious personal knowledge is the 'tacit knowledge' that has been shown to exert such powerful influence on performance. Reflection, in one of its modes, is a learning interaction with personal practice which leads to the enrichment of personal practical knowledge. (Butler, 1996, p. 271)

In essence, PPK is a by-product of personal action and experience (e.g., in a workplace) that has been reflected on and thereby learned from. The reflection is self-initiated and directed and what is learned through reflection is of immediate relevance to current personal circumstances. In contrast, public general knowledge, "is all that abounds outside the self in the form of theories, formal knowledge, policy directives, research results, quality assurance processes, hints and folk lore, community expectations, etc. that seek to direct and perfect human performance" (Butler, 1996, p. 270). Such knowledge already exists, has become quite widely known as it assumed to be useful to many people and in more than one situation, has been recorded, is potentially accessible to everyone and is likely to be acquired in formal education contexts.

PROGRAM

I have previously offered sessions for students in the University of Waikato Science and Technology Cooperative Education program on 'Learning in a Workplace'. In these sessions, prior to placements, I talked with students about PPK: what it was, why gaining access to PPK in workplaces might be worthwhile, what they might need to do gain access to this knowledge and how they might begin to reflect on workplace experiences in order to construct their own PPK. This work has been complemented by the experience of delivering a program for staff within organizations on *Effective Workplace Thinking* that also focuses on PPK, and of teaching about reflection (Haigh, 2000). The Power-Point slides that follow illustrate some of the ideas and issues considered in the sessions for students:

TAPPING OTHERS PPK

Opportunity: to learn about the PPK people in workplaces have developed re using particular processes, skills, tools etc.
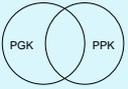
- in 'real world' settings
- over and over again
- in different ways
- for different purposes
- in different places

Good crackle!

TAPPING OTHERS PPK

BUT: people may not spontaneously or readily share their PPK with you

- *not my role to*
- *too busy*
- *what do I know*
- *better not tell you what I really do*
- *I am out of date*
- *can't really tell you how, why. I just do it*

And, they may not tell you about their thoughts, their thinking.

There is more to skilled performance than meets the eye.

TAPPING OTHERS PPK

You need to be Pro-Active and Self-Directed

- make contact – start conversations (relationship starters)

- state your interest in their PPK what they have learned from their experience of ….

- ask questions

- acknowledge your don't knows and uncertainties

- give thanks and feedback

TAPPING OTHERS PPK

Observe closely and carefully

What can you
- recognize
- understand, explain, predict
} Confirm your Classroom Learning (PGK)

What is
- new, different

What can't you
- recognize
- understand, explain, predict
} Plan your own Workplace Learning (PPK)

TAPPING OTHERS PPK

Ask Questions – that will uncover the thoughts and thinking that help account for skilled performance

eg

What do you need to think about before…..?
What do you need to pay attention to?
What goes on your mind when …..?
What do you have to think about when you are deciding ….?
When you are ….. what are weighing up?
What do you have to keep in mind when …
When you ….. what were you thinking about?

TAPPING OTHERS PPK

Take into account *novice to expert* status

Experts can have difficulty recognizing what their 'know how' involves - and talking about it. Often respond to situations unconsciously, naturally, automatically – using intuition when drawing on their expertise. They just know what situations are and what normally works.

Competent people typically are aware of what their expertise involves and find it easier to talk about it. They often like to talk about their know-how.

UNIQUE FEATURES

This approach places an emphasis on helping students consider important contrasts in the *what* and *how* of learning in classroom and workplace settings. It also takes into account uncertainties and anxieties that students may experience in a workplace when they recognize that they must assume responsibility for identifying sources of potentially valuable PPK and for initiating strategies for gaining access to that knowledge. As reflection is the foundation for construction of personal practical knowledge, students are also introduced to specific reflection methods that are likely to be productive when used for this purpose.

DISCUSSION/ARGUMENT

An opportunity to work with staff involved in the AUT University's Sport and Recreation cooperative education program has prompted me to make a review of more recent literature that might further illuminate the concept of PPK and its implications for classroom and workplace learning. What has that review revealed, reinforced and suggested?

1. Continuing research and theorizing about informal learning and workplace learning has increased our understanding of the various forms of knowledge available and valued in classroom and workplace contexts. One of the most helpful sources for an overview of related literature is an article by Eraut (2004) on *Informal Learning in the Workplace*. He distinguishes, as general categories of knowledge, codified knowledge, cultural knowledge and personal knowledge; identifies four main types of work activities "that regularly give rise to learning"(participation in group activities, working alongside others, tackling challenging tasks and working with clients); and presents an elaborated typology of competencies that may be learned in a workplace (see p. 265). The latter is likely to be a useful framework for teachers when identifying appropriate workplaces and designing or tailoring tasks for specific workplaces;[1]

2. Several researchers emphasize the need to avoid inaccurate stereotypes of the forms and contexts of learning in workplaces and higher education institutions. For example, Billet (2004), directly challenges views that workplaces are "informal, non-formal or unstructured learning environments" and that "learning through work will be at best ad hoc, weak, concrete and incidental" (p. 313). He contends that drawing on the concepts of *participation* and *participatory practice* provides a foundation for a more productive analysis of the processes of learning at work (and in classroom contexts): one that reveals similarities as well as differences. This view is endorsed by Hodkinson (2005) who argues that "many of the differences between educational learning and workplace learning which are routinely claimed and/or assumed in the literature are exaggerated" (p. 522), and that "some of the differences between them are no greater and of no more significance than the differences between two different workplaces, or between two different college sites (p. 525). On the basis of a reanalysis of the 'social practices' associated with learning in these two settings, he offers a helpful list of common and dissimilar features (see pp. 525-526). Others also note that differences that may have previously been evident are becoming less apparent as pedagogical practices adopted in both settings change. As Tynjala, Valimaa and Sarja (2003) observe, "Another factor that is narrowing the gap between education and work is the fact that new pedagogical models such as problem-based learning, project learning and collaborative learning have characteristics that simulate authentic situations in working life or may even be based on them" (p. 152). There is an increasing emphasis on authenticity in higher education learning and assessment tasks (Reeves, Herrington & Oliver, 2002), accompanied by a trade of pedagogical wares between both settings;

3. While certain forms of knowledge may be perceived as being more readily or frequently acquired in a workplace, recognizing knowledge that is intrinsic to particular workplace situations is challenging. With this in mind, Moore (2004), offers a helpful reconceptualization of the notion of curriculum to accommodate the realities of workplace life and learning. Drawing on ethnographic studies of students learning in workplaces and phenomenological, interactionist and constructivist views about knowledge construction and use, Moore proposes that "a naturally occurring curriculum of experience" exists in workplaces and that such curriculum represents "the socially organized stock of knowledge in use in the particular environment as it is experienced by the participants, especially newcomers." (p. 329). The process of identifying or discovering this curriculum requires "thinking about the way people involved in a particular situation construct a more or less shared conception of the knowledge through which they organize their interaction and activities ….what one needs to know, how one needs to think in order to do

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[1] Anyone venturing into this field of scholarship will encounter a variety of other terms used to differentiate forms of knowledge, including *formal, theoretical, informal, explicit, tacit, declarative, procedural, propositional, situational, conceptual, received, constructed*.

the work" (p. 331). He emphasizes that a workplace curriculum is not experienced as a static, immutable entity which defines "an idealized content or inventory of data and procedures." Rather, it is a constantly emerging, evolving, phenomena, attuned to particular situations. As such, it constitutes "part of the phenomenal life-world of the participants in the organization." (p. 331). Moore's representation of a workplace curriculum provides a salutary reminder about the challenges of the task of both identifying and gaining access to knowledge within a workplace (including PPK). As he observes, "the analyst of curriculum in the workplace has to search for the dynamic construction of knowledge use and the members' participation in that knowledge without the benefit of lesson plans, learning objectives or texts. Rather one must explore the emergent character of the knowledge-use activities and *ferret out their characteristics*" (p. 331). That ferreting out process, in particular for the newcomer/the student, may be difficult, in part because organizations often have features that deter or provide an obstacle to such activity. However, Moore's own ethnographic inquiries offer helpful frameworks and processes for undertaking this activity;

4. Other research highlights the organization-based helps and hindrances to workplace learning. Billet (2002, 2004) proposes that organizations vary in their 'invitational qualities', which include 'workplace affordances', for learning. Examples of such affordances are access to other workers, time to learn, inclusion in knowledge sharing, participation in discussion groups, access to knowledge, participation in training programs, the encouragement and attitudes of other workers. These affordances may be influenced by "workplace hierarchies, group affiliations, workplace cliques and cultural practice, as well as the kinds of activities in which individuals are able to engage" (Billet, 2002, p. 29). In turn, the latter may be determined by the individuals "standing, means of employment, status or degree of inclusion in workplace affiliations or cliques." Fuller and Urwin (2004) differentiate organizations along a continuum in terms of the extent to which they represent restrictive or expansive learning environments and similarly identify a range of features that can restrict or expand opportunities for learning. Taking a narrower focus, Ellinger and Cseh (2007) have investigated employees' facilitation of one another's learning and the contextual factors that influence that activity either positively or negatively. While these studies have focused on the learning-related environments/affordances experienced by permanent member of workplaces that do raise questions for the planning and assessment of experiences and tasks associated with cooperative education programs:

    a. (a) Do we, and our students, need to make more effort to identify features of particular work environments that will determine the feasibility of particular learning and assessment tasks, which may include accessing PPK? Two studies on workplace research projects, which are a common feature of cooperative education programs, emphasize the need for teacher and student to make such analyses when conceptualizing and planning such projects (Workman, 2007; Costley and Armsby, 2007). This would imply, in Workmans' terms, that we (learn how to) "case the joint" for this purpose; and

    b. When assessing students' workplace learning and performances, should we take into account the extent to which particular work environments are restrictive or expansive, and the nature of their particular affordances? Classroom-based learning is perceived as offering students relatively equable learning and assessment opportunities, or affordances. This may be less likely when students are situated in diverse workplaces.

5. While students are likely to perceive a workplace as a given and beyond their direct influence, learners in workplaces are also generally perceived as agents of their own learning destinies. As Billet (2002) observes, "While the contribution of the workplace is important and it can be gauged in terms of its invitational qualities, the agency of individuals is also an important basis for engagement and learning through work" (p. 30). And, findings from a recent New Zealand study suggest that the individual's sense of personal agency will influence the extent to they perceive workplace environments as presenting them with restrictive or expansive learning opportunities (Bryson et al., 2006). A related concept, addressed in a number of studies of work place learning is self-efficacy belief (Bandura, 1977) and Bryson et al. (2006) also propose that variations in people's disposition to be proactive may be relevant, along with self-efficacy. If workplace learning calls for a greater level of proactivity coupled with strong self-efficacy belief, how might this disposition might be engendered in students? In my previous work with students, I have observed that workplace learning, including accessing PPK, is likely to require them to be more proactive than will be the case for classroom learning, and suggested strategies that they could adopt to be proactive. Can we do more to help students develop a strong sense of agency/self efficacy/proactivity?

ISSUES AND IMPLICATIONS

The process of constructing this paper has reinforced my view that we should do more to prepare students for learning in workplaces, and reaffirmed steps that I have taken previously to do so in relation to acquiring and constructing PPK. However, my review of literature and accompanying

25

conversations with colleagues, have prompted the view that the associated curriculum needs to be more extensive if we are to do justice to preparing them for immediate cooperative education experiences and their future professional learning. I also now recognize that while some of the topics that we, as teachers could include in that curriculum have been identified in the review above, curriculum development will necessarily be a responsibility shared with students as the potential curriculum also exists out there, in the minds of members of the workplace. This implies that students need to (learn how to) identify what can be learned in the course of their workplace experiences, how it might be learned, the possible role of a teacher in relation to their learning, and criteria and methods for evaluating aspects of their learning. I am sure that many students already recognize that this is an inevitable element, and possibly an attraction, of their workplace learning ("You have to wait until you are out there to find out what you will be able to learn"), but they are probably unsure about frameworks and tools that they might use for this purpose. I note that this role for students is compatible with the legislative mandate that the development of intellectual independence be the primary purpose for education at a New Zealand university.

What lies ahead is work with my AUT University colleagues on a possible curriculum on learning in workplaces, and hopefully its trial and systematic evaluation. My speculative views, as above, about students' experience of workplace learning also require systematic investigation.

REFERENCES

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Billet, S. (2002). Workplace pedagogic practices: Participation and learning. Australian Vocational Education Review, 9(1), 28–38.

Billet, S. (2004. Workplace participatory practices: Conceptualizing workplaces as learning environments. The Journal of Workplace Learning, 16(6), 312–324.

Bryson, J., Pajo, K., Ward, R., & Mallon, M. (2006). Learning at work: Organizational affordances and individual engagement. Journal of Workplace Learning, 18(5), 279–297.

Butler, J. (1992). Teacher professional development: an Australian case study. Journal of Education for Teaching, 18(3), 221–238.

Butler, J. (1996). Professional development: Practice as text, reflection as process, and self as locus. Australian Journal of Education, 40(3), 265–283.

Costley, C., & Armsby, P. (2007). Methodologies for undergraduates doing practitioner investigations at work. Journal of Workplace Learning, 19(3), 131–145.

Ellinger, A. and Cseh, M. (2007). Contextual factors influencing the facilitation of others' learning through everyday work experiences. Journal of Workplace Learning, 19(7), 435–452.

Eraut, M. (2008). Informal learning in the workplace. Studies in Continuing Education, 26(2), 247–273.

Fuller, A., & Unwin, L. (2004). Expansive learning environments: integrating organizational and personal development. In H. Rainbird, A. Fuller & A. Munro (Eds.), Workplace learning in context (pp 126–144). Routledge, London.

Haigh, N. (2000).Teaching teachers about reflection and ways of reflecting. Waikato Journal of Education, 6, 87–97.

Hodkinson, P. (2005). Reconceptualizing the relations between college-based and workplace learning. Journal of Workplace Learning, 17(8), 521–532.

Moore, D.T. (2004). Curriculum at work: An educational perspective on the workplace as a learning environment. The Journal of Workplace Learning, 16(6), 325–340.

Reeves, T., Herrington, J., & Oliver, R. (2002). Paper in the proceedings of the Annual Conference of the Higher Education Research and Development Society of Australasia. Retrieved 05 May 2008 from http://www.ecu.edu.au/conferences/herdsa/main/papers/ref/pdf/Reeves.pdf

Tynjala, P, Valimaa, J., & Sarja, A. (2003). Pedagogical perspectives on the relationship between higher education and working life. Higher Education, 46, 147–166.

Workman, B. (2007). 'Casing the joint': Explorations by the insider-researcher preparing for work-based projects. Journal of Workplace Learning, 19(3), 146–160.

Letting go: changing ownership of the learning and assessment process in cooperative education

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BACKGROUND

Assessment has often been described as a 'thorn in the side' of co-operative education practitioners. This is largely because workplace learning is complex and uncertain. Required to package learning into neatly proscribed and specific learning outcomes, before wrapping these up with faculty-controlled assessment processes, we are faced with a real dilemma. For it is often the non-curricula related and unexpected learning that occurs in the 'messy' world of work that provides the most value to students - yet this is hard to pin down and reliably assess. Acculturated in classroom-based pedagogy and the 'rules of engagement' in our communities of educational practice, staff and students sometimes struggle to undertake the necessary 'boundary crossing' into the communities of work practice (Engeström, Engeström & Karkkaninen, 1995). Add to this that each student has different expectations of what they want to get out of the placement, and you end up with a high level of complexity. Faced with these difficulties, our tendency is to cling on to what we know best - focusing our attention on *instrument reliability*, while largely ignoring the validity of what we are measuring and who is in the best position to pass judgment on its achievement.

CONTEXT

This study involves an intervention in the assessment of the industry based learning (IBL) course in the Bachelor of Business (BBus) degree. The IBL course is a compulsory final year course involving up to 50 students per semester, who spend around 150 hours undertaking a work placement related to their study major. There is considerable variability in the type, size and nature of the potentially 50 or so organizations in which the students will be placed. Students are supported during the placement period by an academic supervisor (typically 10-15 supervisors may be allocated in any one semester). Before going out on placement students attend a number of preparatory workshops provided by the course coordinator.

Like all BBus courses, IBL has a number of expected 'learning outcomes' that student achievement is assessed against. Previously, the assessment involved three components: students providing a set of personal learning goals (10% weighting); assessment of work performance using specified criteria and guidelines, involving the host employer, student and academic in a collaborative process (55% weighting); and students reflecting on their experiences by way of a *reflective essay* (worth 35%). The final grade is determined by an aggregation of weighted marks given for each assessment component (using an eleven point system from A+ to E).

Current practices are problematic for a number of reasons. These include: questionable assumptions made about stakeholder understanding of the given criteria (and related performance standards); potential for a conflict of interest to arise between the formative and summative elements; questionable *fairness* of the 55% weighting currently allocated to work performance; and questionable assumptions made about the level of precision accorded to performance in the 11 point grading system. There is also questionable *validity* in the assessment method used, which is essentially a form of *criterion referencing*. However, in complex situations involving multiple elements (such as that described here) criterion referencing is considered to be problematic and inappropriate (Gipps, 1994). The other key *validity* issue is that assessment is focused on *current* performance and learning. According to Boud and Falchikov (2006), assessment must always do 'double duty' by ensuring that we not only consider current learning, but also the impact of assessment on future learning.

Portfolio of Learning

In response to the assessment problems described, a portfolio approach to assessment was introduced. Portfolio assessment has been described as "the evaluation of performance by means of a cumulative

collection of student work" (Koretz, 1998, p. 309-334). The portfolio model adopted here is outlined in Figure 1. The model takes a holistic approach by making explicit connections between each of the course's four learning outcomes and also between formative and summative methods. The two key features of the model are that it is *evidence-based* and that it attempts to contribute to a student's preparation for being an effective employee and *self-regulating* professional.

FIGURE 1
A portfolio assessment model
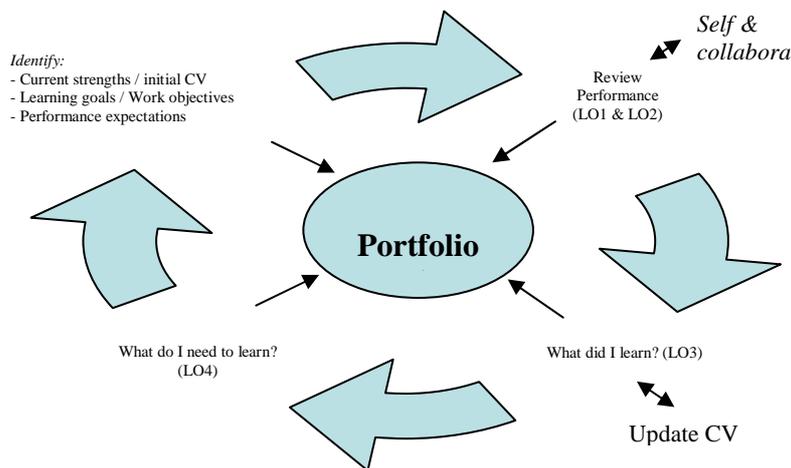
Before students commence their placement a 'learning agreement' is drawn up, which specifies the work objectives, together with the responsibilities of the three parties involved (the workplace supervisor, the academic supervisor and the student). Students are then required to produce an updated curriculum vitae and two to three personal and professional learning goals for their placement. The IBL portfolio requires students to produce evidence of their learning, measured against the course's four learning outcomes. The first two learning outcomes (LO1 and LO2) are concerned with work performance and the student is expected to identify performance expectations and collect evidence during their placement to demonstrate achievement. Upon completion of the placement the three parties separately assess student performance against a range of competencies, as well as the quality and value of the work produced. The three parties then meet to discuss their views. The meeting is largely formative, with no marks allocated. The latter two learning outcomes (LO3 and LO4) are concerned with establishing what has been learned on placement (via critical reflection) and how this informs future personal and professional development. Students use a weekly learning journal[2] to assist with this and this forms the basis for an on-going dialogue (the 'long conversation') with their academic supervisor. To meet the evidential requirements for meeting the *critical reflection* outcome, students are expected to draw upon: the information they have collected in their learning journals; feedback from the collaborative assessment meeting; and their overall workplace experiences. The final part of the portfolio requires students to develop a summary of the skills and competencies developed during their placement. This is used to assist development of an updated C.V., as well as future learning goals.

A three point competency-based assessment grading system is used - 'merit pass', 'pass' or 'not yet competent'. By submitting their portfolios, students are indicting that they believe they have self-assessed their portfolio as meeting the learning outcomes, that is, a 'pass'. Criteria for a 'merit pass' involves providing evidence of outstanding performance as well as a higher level of critical reflection. Academics are assigned to *validate* the students' self assessment. A key aspect of the validation process is that a validator does not have the final say should they disagree with a student's self-assessment. Instead, any portfolios not initially 'validated' will be reviewed by a validation team (two or three independent academics).

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[2] Students are encouraged to keep a 'private' and 'public' version of their journal, only disclosing to the supervisor their 'public' version

AIM

The acceptability of the assessment model to the key stakeholders involved was of critical importance. The model was therefore introduced and approved as a pilot, with an understanding that evaluative feedback would be sought from the stakeholders involved following implementation.

METHODS

This paper reports on initial quantitative and qualitative data collected at the end of the first semester, involving a questionnaire survey of employers and students, and three separate focus groups of academic supervisors. The student and employer questionnaires used a range of statements requiring respondents to indicate their level of agreement against a five point Likert scale – five indicating 'strongly agree' and one 'strongly disagree'.

The student questionnaire was administered during the portfolio hand-back and debrief session. Overall 20 of the 28 students enrolled completed the survey (71% response rate). The employer questionnaire was conducted through a telephone survey. This method was expected to generate a high response rate and also provided the opportunity to probe further, if necessary, to responses given to the open ended questions. Overall, 22 employers were available to make comment from the 28 employers who hosted students (representing a 79% response rate).

Focus groups of academic supervisors were undertaken as these enabled individual opinions to be discussed with peers. These sessions would also enable information sharing to occur should issues be raised that had already been addressed (e.g., in the portfolio guidelines). In total, three focus groups were held involving nine academics. An interpretive approach was used involving semi-structured interview questions, as this enables insights to participant constructs (Good, Wandersee & St. Julien, 1993), within the social context of their workplace. Each focus group session was audio-taped and transcribed. Following analysis of the transcripts, three key areas of relevance to the portfolio emerged, which are discussed in the findings.

RESULTS

Student Views

Table 1 shows the results of the student questionnaire survey. On the five point scale (five being strongly agree) all statements elicited an overall mean score above four. The strongest level of agreement related to statements concerning the collaborative assessment process, indicating that students felt that this was particularly valuable.

Employers

Employers were asked a number of questions related to the collaborative assessment process. Table 2 shows the mean scores attributed to the responses provided. As can be seen, all means were above four indicating approval of the assessment process and their involvement in it. The highest support given was for the value of involving all three parties in the discussion (mean of 4.24).

Academic Supervisors

The responses from academics are categorized into the three themes that emerged from the three focus groups.

Collaborative Assessment

The key change made in the portfolio pilot model was that marks were no longer allocated to the collaborative assessment process, only qualitative feedback. This feedback forms important evidence for students' portfolios. There were mixed views on this change, although most academics supported the move to a focus on qualitative comments, rather than quantifying performance by allocating marks. Most accepted that there were flaws in the previous model, as one academic noted, "they [employers] did tend to inflate [the grades]…the workplace supervisor tended to be very liberal with the mark and that did not really reflect the true achievement of the student".

29

TABLE 1
Student views on IBL assessment – Semester 1, 2007

Course Assessment Statements	Mean
As a result of completing the portfolio, I feel more confident self-assessing my competencies	4.25
As a result of completing the portfolio, I feel more confident self-assessing my work performance	4.20
As a result of completing the portfolio, I am more able to understand myself and the way that I learn	4.05
I intend to use elements of the portfolio for my personal and/or professional development in the future	4.30
The portfolio's self assessment process was a valuable learning experience	4.20
I understood what I needed to do in order to gain a Pass Grade	4.35
I understood what I needed to do in order to gain a Merit Pass Grade	4.18
Using a competency-based grading system (Merit Pass, Pass etc.) is appropriate in this type of course	4.30
Overall, the portfolio assessment process was appropriate and fair	4.20
The collaborative assessment guide was helpful in outlining expected workplace competencies	4.50
Prior to the three-way meeting I had collected relevant and sufficient evidence to support my self-assessment	4.55
Prior to the three-way meeting I felt confident that my self-assessment would be confirmed by the host sponsor and academic supervisor	4.55
The feedback I received at the Collaborative Assessment meeting was valuable and fair	4.60

TABLE 2
Employer views on IBL assessment – Semester 1, 2007

	Mean
The requirements of the collaborative assessment of the student's performance and development were clearly communicated to me	4.05
Involving the three parties in face-to-face assessment of student performance and development was a valuable process	4.24
The Collaborative Assessment Guide was clear and helpful	4.05
The performance and competency statements in the Collaborative Assessment Guide are appropriate and fair	4.00
OVERALL, I was satisfied with the process used to assess the student's performance and development needs	4.00

Portfolio

A number of comments emerged around the portfolio itself, what it was intended to do and how it was meant to be completed. A level of uncertainty was evident in each of the focus groups about portfolio requirements, and this may have impacted on academic views of the portfolio. As one academic noted, "I personally preferred the old system, but then I think you get used to something. I did find it [the portfolio requirements] confusing".

The timing of the academic focus groups needs to be noted here, as these occurred about two weeks into the second semester. Changes to the portfolio guidelines were made at the end of the first semester in order to improve clarity, and awareness of these changes seemed to influence their responses:

 "I'm much more comfortable going through it this time [Semester 2]" – Cathy
"Where were you [the revised guidelines] last semester?" - Ken
"I think the [evidential requirements for the] learning outcomes are clearer, I can't recall them in this order" - Andy

One particular issue that emerged was in relation to students determining for themselves whether they had achieved the learning outcomes, rather than academics determine this for them. For some academics 'letting go' of assessment ownership was not easy, as one commented, "in the previous regime we had a lot more hands on and when it was devolved back to the students to do their portfolio and their self assessment I did somewhat feel that we were moving a little bit of the control / boundaries". At the end of each focus group supervisors were asked to consider whether, overall, the portfolio was working well or not. Responses indicated strong support, perhaps best summed up by Cathy, "I think that perhaps this is a more equitable basis for assessing student performance, I'm

30

amazed to have said that because as a good accountant, without numbers how can you possibly know that?"

CONCLUSIONS

Initial analysis of stakeholder feedback indicates positive support for the portfolio model introduced. Both students and employers indicated high levels of satisfaction. Faculty had mixed views about elements of the changes introduced, although overall were positive about the value of the portfolio for students. Some faculty found it difficult to 'let go', with some wanting to intervene and reward the 'better' students (through an eleven point grading system), rather than having students self-assess their learning via a simpler three point competency-based approach. To a large extent this view is not unexpected.

REFERENCES

Boud, D., & Falchikov, N. (2006). Aligning assessment with long-term learning. Assessment and Evaluation in Higher Education, 31(4), 399-413.

Engeström, Y., Engeström, R., & Karkkaninen, M. (1995). Polycontextuality and boundary crossing in expert cognition: Learning and problem solving in complex work activities. Learning and Instruction, 5(1), 319-366.

Gipps, C.V. (1994). Beyond testing: Towards a theory of educational assessment. London: Falmer.

Good, R.G., Wandersee, J.H., & St. Julien, J. (1993). Cautionary notes on the appeal of the new "ism" (contructivism) in science education. In K. Tobin (Ed.), The practice of construction in science education (pp. 71-87). Hillsdale, NJ: Lawrence Erlbaum.

Koretz, D. (1998). Large-scale portfolio assessments in the US: Evidence pertaining to the quality of measurement. Assessment in Education, 5(3), 309-334.

What competencies should sport and recreation students focus on during their cooperative experience to make them employable?

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INTRODUCTION

Cooperative education programs aim to prepare students for the workplace by developing both generic and specific competencies useful to both the student and the employer. Researchers have investigated the competencies relevant to business and science and technology graduates (Coll & Zegward, 2006; Hodges & Burchell, 2003). However, there is little published research on the perceptions of the skills or graduate competencies that employers desire of sport and recreation graduates entering the workforce. In a study examining New Zealand job advertisements during a three-month period, Wiersma and Bradbury, (2004) identified the 'soft skills' such as communication, customer service, motivation, passion and enthusiasm, as well as practical work experience as being important requirements for employability in the sport and recreation industry. A report on graduate recruitment in the leisure industry in Australia highlighted that a strong knowledge base alone does not guarantee a new graduate employment and that personal attributes and capabilities of the graduate are considered to have a greater influence on success in the workplace (Bell, Grebert, Partrick, Bates & Cragnolini, 2003). Sleap and Reed, (2006) and Bell et al. (2003) highlight the importance of work placements in developing appropriate competencies for the graduate in the sports science and leisure management areas, respectively. To maximize the learning opportunities, students need to be capable of contributing to the workplace environment. A search of the literature failed to identify any research that described the competencies that students should have developed through their university studies to enable them to undertake a successful cooperative education or work placement experience in the sport and recreation industry. Therefore, the aim of this study was to identify key competencies needed by sport and recreation students entering their cooperative placement as well as to identify the difference between student and graduate competencies.

CONTEXT

The research was undertaken within the context of the Bachelor of Sport and Recreation (BSR) at AUT University. The BSR is a three-year program designed to prepare students for careers in the areas of sports science, sport and recreation management, coaching, physical activity, nutrition and health, physical education or outdoor education. The cooperative education component of the BSR involves final year students completing 350 hours in a sport or recreation organization over two semesters as well as undertaking a project for the organization.

METHODS

A quantitative research approach was used in this study. Forty-five industry supervisors of sport and recreation cooperative education students (in 2006 and 2007) were invited by e-mail to complete an on-line survey. Seventeen supervisors participated in the survey (response rate 38%). Supervisors were asked to rate the importance of a list of 24 specific competencies (adapted from previous research by Burchell, Hodges and Rainsbury, 2000; Coll & Zegward, 2006) for the cooperative student and for the graduate using a seven-point Likert scale (1= unimportant; 7 = important). Each competency was defined to try and ensure that a similar meaning was given to each term (Appendix A). Participants were prompted to add any further competencies if they deemed it appropriate.

Mean values and standard deviations were calculated for all competencies. Chi-squared analysis was applied to determine significant differences between competencies required of cooperative education students and graduates. Non-parametric statistics were used as this was deemed more appropriate for the small sample size.

RESULTS

Industry supervisors responded from the following sport or recreation organizations: Regional sports organizations (4), schools (4), recreation centers (2), sports performance centers (2), regional councils (2), sports club (1), physical activity and health promotion agency (1), outdoor recreation (1). Three years was the average length of time participants had been involved as industry supervisors for BSR cooperative education students. Only one participant had been in the role of industry supervisor for one year.

The results (Appendix B) indicate that the five most important competencies for a student to have developed prior to starting their cooperative education placement were: *Ability and willingness to learn* (mean 6.18); *initiative* (5.59); *personal planning and organizational skills* (5.35); *interpersonal understanding* (5.12) and *concern for order, quality and accuracy* (5.00). Similarly, the top three competencies were rated in the same order for the graduate as for the student: *Ability and willingness to learn* (6.88); *initiative* (6.76); *personal planning and organizational skills* (6.53). *Relationship building* (6.53) and *teamwork and cooperation* (6.35) were also rated in the top 5 for importance for the graduate.

Mean values for all competencies were above 5 (out of a possible 7) for the graduate. However only 6 competencies had mean values above 5 for the student. Industry supervisors rated the least important competencies for a student to have prior to starting their cooperative education experience as: *Directiveness* (2.94); *impact and influence on others* (3.06); *developing others* (3.05); *team leadership* (3.05) and *organizational awareness* (3.41). The least important competencies for graduates were *impact and influence on others* (5.06), *written communication* (5.06) and *information seeking* (5.12). When the data were separated in to behavioral versus cognitive competencies, the behavioral competencies had higher average mean values for both students and graduates when compared to the cognitive values.

When analyzing the numbers of responses for a rating of 7 (important), there was a statistically significant correlation found between the responses for the student and for the graduates (correlation coefficient = 0.74). Chi-squared analysis comparing the rating of the competency as 7 was significantly higher for the graduate compared to the student in *teamwork and cooperation* and *analytical thinking*.

DISCUSSION

The findings of this study highlight that sport and recreation industry supervisors believe that the most important competencies (i.e., *ability and willingness to learn*, *initiative* and *personal planning and organizational skills*), are needed by both a cooperative education student and a graduate. The competencies therefore need to be supported and reinforced throughout the student's undergraduate program, in addition to emphasis during the cooperative education experience.

In order to create willingness and ability to learn, students need to be exposed to new, exciting and authentic experiences relevant to their discipline of study (Coll & Zegward, 2006). In the university setting, this can be achieved by lecturers sharing industry relevant experiences to inspire students and create enthusiasm for the discipline. In the industry setting the student experience needs to be meaningful, have clear objectives and the nature of the tasks carried out by the student need to be challenging while attainable. In order to foster a sense of achievement students need to be encouraged to reflect on their experiences in order to acknowledge that new learning has occurred.

Development of initiative and personal organizational skills can be facilitated through learning strategies such as project work, which occurs in both the university and industry settings. Undertaking a project for the organization during the BSR cooperative experience has been reported by students to develop initiative and time management skills as well as providing opportunities for increased responsibility and the development of confidence (Fleming & Eames, 2005). While personal organizational skills are constantly reinforced through their program of study, it is during the industry experience where the students develop the confidence necessary to not only develop initiative but to also use that initiative within their practice.

It is important to note that supervisors considered all competencies listed in the survey to be relatively important for a graduate but overall not as important for a student. This reinforces the importance of the development and active utilization of these competencies throughout the cooperative education experience. Furthermore, students should focus on *relationship building* and *developing teamwork and cooperation* during their industry placement, as these were ranked within the top five desired of the graduate but not of the student. Previous research within the BSR program has highlighted that the

amount of time (350 hours) spent during the cooperative education experience is important for relationship building and enculturation into the community of practice (Fleming & Eames, 2005). The biggest gap between student and graduate competencies was identified as *teamwork and cooperation* and *analytical thinking*. These are competencies that are needed for solving problems and creating solutions in collaboration with others in the workplace context. Therefore these competencies are likely to be considered more important for a graduate than a student who is new to the workplace setting.

The findings of this study are consistent with those identified by Coll and Zegwaard (2006) where science and technology and business sector employer cohorts ranked *ability and willingness* to learn as the top desired competency. *Initiative* was also identified as one of the top five competencies by both groups. *Customer service skills* are highlighted as a key competency by the business sector. This is consistent with that reported by Wiersma and Bradbury, (2004) who examined sport management related advertisements. However the findings of the current study are similar to those of the science and technology sector in that customer service skills were not ranked among the top five competencies. This could be due to the diverse range of organizations within the sport and recreation industry where a customer service approach is not essential to the core business. Also consistent with Coll and Zegwaard (2006) are the findings of the least important competencies required by graduates, which included *directiveness*, *organizational awareness*, *developing others*, and *impact and influence on others*.

As employment opportunities in some areas of sport, such as sport performance and exercise science are limited, transferable skills are essential for creating expanded opportunities in related vocations. In addition, there is considerable diversity within the sport and recreation industry such that a full range of skills cannot be covered in any one degree structure. A graduate with specific knowledge may be considered an advantage to some employers but more often this knowledge is better learned within the specific work context where it will be utilized. This is supported by the findings that indicate that *technical skills and competence* were ranked 14th out of 24 in importance for a graduate. This is further illustrated when the importance of behavioral skills is compared to cognitive skills (often referred to as the soft and hard skills, respectively). The supervisors rated the behavioral skills of greater importance than cognitive skills for both students and graduates. It is frequently reported in the literature that universities do not emphasize the development of the behavioral skills and that the focus is more on the cognitive skills (Coll & Zegwaard, 2006; Wiersma & Bradbury, 2003). However, cooperative education experiences included within the curriculum have been shown to support the development of behavioral competencies (Dressler & Keeling, 2005). The findings of this study highlight that students need a certain level prior to starting their cooperative experience and that it cannot be assumed that the development of behavioral competencies can be left entirely for the work integrated learning component of a degree in sport and recreation.

CONCLUSIONS AND IMPLICATIONS

Academic programs within a university need to ensure that students are provided with opportunities to facilitate the development of competencies including the ability and willingness to learn, the use of initiative and personal organizational skills. Cooperative education experiences should provide opportunities for students to develop in the areas of relationship building as well as teamwork and cooperation.

The sport and recreation sector is relatively underdeveloped and therefore it is important to identify and communicate to the tertiary education providers the needs of the industry in order to create successful cooperative education partnerships. The findings of this study therefore will assist in curriculum design as well as determining what competencies students should focus on developing and enhancing throughout their cooperative education experience in order to increase the likelihood of employment as graduates.

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REFERENCES

Bell, B., Crebert, G., Patrick, C-J., Bates, M., & Cragnolini, V. (2003). Educating Australian leisure graduates: Contexts for developing generic skills. Annals of Leisure Research, 6(1), 1-19.

Burchell, N., Hodges, D., & Rainsbury, E. (2000). What competencies do business graduates require? Perspectives of New Zealand stakeholders. Journal of Cooperative Education, 35(2-3), 11-20.

Coll, R.K., & Zegward, K.E. (2006). Perceptions of desirable graduate competencies for science and technology new graduate. Research in Science and Technological Education, 24(1), 29-58.

Dressler,S., & Keeling,A.E (2004). Benefits of cooperative education for students. In R.K. Coll & C. Eames (Eds), International handbook for cooperative education: An international perspective of the theory, research and practice of work-integrated learning (pp. 217-236). Boston: World Association for Cooperative Education.

Fleming, J., & Eames, C. (2005). Student learning in relation to the structure of the cooperative experience. Asia-Pacific Journal of Cooperative Education, 6(2), 26-31.

Hodges, D., & Burchell, N. (2003). Business graduate competencies: employers' views on importance and performance. Asia-Pacific Journal of Cooperative Education, 4(2), 16-22.

Sleap, M., & Read, H. (2006). Views of sports science graduates regarding work skills developed at university. Teaching in Higher Education, 11(1), 47-61.

Spencer, L.M., & Spencer, S.M. (1993). Competence at work. New York: John Wiley and Sons, Inc.

Wiersma, C., & Bradbury, T. (2004). Academia and industry: Ever the twain shall meet? Australasian Parks and Leisure, Spring, 35-36.

APPENDIX A

Definitions of competencies (Coll & Zegward, 2006 from Spencer & Spencer, 1993)

Teamwork & cooperation (fosters group facilitation and management, conflict resolution, motivation of others, creating a good workplace climate)
Flexibility (adaptability, perceptual objectivity, staying objective, resilience, behavior is contingent on the situation)
Relationship building (networking, establish rapport, use of contacts, concern for stakeholders e.g. clients)
Computer literacy (able to operate a number of packages and has information management awareness)
Conceptual thinking (pattern recognition, insight, critical thinking, problem definition, can generate hypotheses, linking)
Technical expertise (job related technical knowledge and skills, depth and breadth, acquires expertise, donates expertise)
Organisational awareness (understands organization, knows constraints, power and political astuteness, cultural knowledge)
Concern for order, quality & accuracy (monitoring, concern for clarity, reduces uncertainty, keeping track of events and issues)
Impact & influence on others (strategic influence, impression management, showmanship, persuasion, collaborative influence)
Initiative (bias for action, decisiveness, strategic orientation, proactive, seizes opportunities, self motivation, persistence)
Customer service orientation (helping and service orientation, focus on client needs, actively solves client problems)
Developing others (training, developing others, coaching, mentoring, providing support, positive regard)
Directiveness (assertiveness, decisiveness, use of power, taking charge, firmness of standards, group control and discipline)
Team leadership (being in charge, vision, concern for subordinates, builds a sense of group purpose)
Analytical thinking (thinking for self, reasoning, practical intelligence, planning skills, problem analyzing, systematic)
Self control (stamina, resistance to stress, staying calm, high Emotional Quotient, resists temptation, not impulsive, can calm others)
Organizational commitment (align self and others to organizational needs, business-mindedness, self sacrifice)
Ability and willingness to learn (desire and aptitude for learning, learning as a basis for action)
Interpersonal understanding (empathy, listening, sensitivity to others, diagnostic understanding, awareness of others' feelings)
Self confidence (strong self concept, internal locus of control, independence, positive ego strength, decisive, accepts responsibility)
Personal planning and organizational skills
Written communication
Information seeking (problem definition, diagnostic focus, looking deeper, contextual sensitivity)
Achievement orientation (task accomplishment, seeks results, employs innovation, has competitiveness, seeks impact, aims for standards and efficiency)

APPENDIX B

Industry supervisor ratings of the importance of competencies for the student prior to starting their cooperative education experience and the graduate

	Student		Graduate	
	Mean (sd)	ranking	mean (sd)	ranking
Teamwork & cooperation	4.35 (1.32)	10	6.35 (1.06)	5
Flexibility	5.0 (1.37)	5	6.05 (1.20)	10
Relationship building	3.52 (1.94)	18	6.52 (0.87)	4
Computer literacy	4.52 (1.62)	9	5.35 (1.58)	18
Conceptual	4.11 (1.83)	12	5.41 (1.58)	16
Technical expertise	3.47 (1.97)	19	5.58 (1.33)	14
Organizational awareness	3.41 (1.97)	20	5.35 (1.41)	17
Concern for order, quality & accuracy	5.0 (1.70)	6	6.23 (1.09)	6
Impact influence on others	3.05 (1.68)	21	5.05 (1.25)	24
Initiative	5.58 (1.33)	2	6.76 (0.66)	2
Customer service	4.11 (1.76)	13	5.94 (1.20)	11
Developing others	3.05 (2.33)	22	5.29 (1.45)	20
Directiveness	2.94 (1.75)	24	5.29 (1.05)	19
Team leadership	3.05 (2.11)	23	5.23 (1.30)	21
Analytical thinking	3.76 (1.75)	17	5.88 (1.27)	13
Self control	4.75 (1.81)	15	5.88 (1.11)	12
Organizational commitment	4.11 (2.26)	14	5.47 (1.42)	15
Ability, willingness to learn	6.17 (1.38)	1	6.88 (0.49)	1
Interpersonal understanding	5.11 (1.90)	4	6.05 (1.20)	9
Self confidence	4.05 (1.75)	8	6.05 (1.20)	8
Personal planning, org skills	5.35 (1.58)	3	6.529 0.87)	3
Written communication	3.82 (1.88)	16	5.05 (1.60)	23
Information seeking	4.17 (1.47)	11	5.11 (1.27)	22
Achievement orientation	4.76 (1.71)	7	6.05 (1.39)	7

Investigating the 'integrated' in work-integrated learning

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INTRODUCTION AND BACKGROUND

Work-integrated learning (WIL) is an educational strategy in which students undergo conventional academic learning with an educational institution, and combine this with some time spent in a workplace relevant to their program of study and career aims. It goes under a number of names internationally; sandwich degree (Ward & Jefferies, 2004); cooperative education; and internships (Groenewald, 2004; Sovilla & Varty, 2004; Walters, 1947). The name cooperative education reflects the tripartite nature of WIL in which the student, tertiary education institution (TEI), and workplace work together collaboratively to develop a comprehensive skill set in students (Coll, 1996). Recently the World Association for Cooperative Education added 'integrated' in a by-line to its name to reflect a broader perspective of the nature of cooperative education that can include capstone programs [practicum], internships, sandwich degrees, and work-based learning via industry-projects (Franks & Blomqvist, 2004). A key aspect of WIL is the notion that it entails the *integration of knowledge* and skills gained in the educational institution and in the workplace. It is the integration aspect of WIL that distinguishes it from workplace learning (i.e., simply what a student or employee learns in the workplace, see Boud & Falchikov, 2006).

Eames (2003) notes that whilst there is a rich literature on the success of WIL programs, such research is almost entirely concerned with what he terms 'operational outcomes', such as benefits for students (Dressler & Keeling, 2004), employers (Braunstein & Loken, 2004), and TEIs (Weisz & Chapman, 2004). For example, it has been reported that compared with conventional graduates students who participate in WIL programs gain employment more easily, fit in better in the workplace, advance more rapidly in their careers, and so on (Dressler & Keeling, 2004). However, there is a serious paucity of research into what WIL students learn, how they learn, whom they learn from (Eames & Bell, 2005), and how the learning might be better facilitated and supported. A key purpose of work-integrated learning is the notion of providing graduates with a comprehensive skill set desired by potential employers. However, the literature notes that it is problematic for tertiary education providers to provide students with such skills, especially behavioural skills; the so-called soft skills (Burchell, Hodges & Rainsbury, 2000; Coll & Zegwaard, 2006). In what way does the student take what he or she has learned into the workplace, and conversely in what way does what the student learns in the workplace become related to, or incorporated into, the next phase of academic learning when he or she returns to the TEI after completing a work-placement?

CONTEXT

The aim/objective(s) of this current study are to investigate which pedagogical approaches in New Zealand WIL programs are currently used by WIL practitioners in terms of learning and the integration of academic-workplace learning, and what impact do these have on student learning? The authors of this paper are both WIL practitioners and senior researchers who are conducting the research in partnership. Together the parties will investigate their respective WIL programs and the use of pedagogical approaches within them. The context for this study is three important sectors of New Zealand tertiary education; business and management; sport studies; and science and engineering, and a cohort of higher educational institutions that offer WIL/cooperative education in a variety of ways.

METHODS

The research is interpretive in nature (Guba & Lincoln, 1994; Merriam, 1998). There are two main data sources, interviews with three stakeholder groups (namely employers, students and co-op practitioners), and analyses of relevant documentation (e.g., course/paper outlines, assignments on reflective practice, portfolio of learning, etc.). In this study, credibility is enhanced by the use of triangulation (Yin, 1994), which involves comparison of findings from multiple methods of data collection, and cross-case analysis, which reviews "processes and outcomes across many cases, to understand how they are qualified by local conditions, and thus develop more sophisticated descriptions and more powerful explanations" (Miles & Huberman, 1994, p. 172).

Ethical issues identified include potential conflict of interest if team members are in positions of authority over institutional staff and students, confidentiality of participant identities, institutions and participant discourse (e.g., interview transcripts), data storage, use of data, minimization of harm, and informed consent. A full ethical proposal has been evaluated and approved by the University of Waikato's Centre for Science & Technology Education Research Human Research Ethics Committee, and each of the other higher educational institutions ethics committees involved in the work.

This paper focuses on the preliminary findings from initial focus group interviews related to Sport Management Practicum (SMP) within the Bachelor of Business Studies (BBS) and Bachelor of Sport & Exercise (BSpEx) degrees at Massey University, Palmerston North (Martin & Leberman, 2005). The interviews were facilitated by an independent researcher who did not know the interviewees or the sport context. The interview questions focused on pedagogies and learning that occurred on campus and on placement or both. The interviews were recorded and then transcribed. The facilitator focused the interview by summarizing responses on a white board using the headings 'stop', 'start', 'continue'. It is the thematic analysis of these summaries that is presented here from each of the focus group interviews (the transcribed interview data will be analyzed later and compared to these themes).

RESULTS AND DISCUSSION

The following preliminary results will be described and discussed with respect to the literature. In particular a focus will be on the integration of on-campus and off-campus learning, and the means used to facilitate this. Work integrated learning in sport "provides a point of difference that employers value." The three main student learning themes that the practicum provided opportunities for, identified by each of the focus groups (recent student-graduates, supervisor-employers, university supervisors-co-op practitioners), were

- preparation in the 'real world';
- personal achievement; and
- networking.

The practicum changed attitudes and behaviors, with a more professional approach applied before work, which then provided a launch into the job market. The students indicated they "developed as people," as they were able to reflect and self assess upon their workplace "journey." The experiences resulted in greater self awareness, self-confidence, self belief, and improved task, project, and time management skills. The work based experience also reaffirmed the value of theory learned on campus, and that university was beneficial.

Pedagogies that were used on campus were lectures, practicum classes, facilitated reflection (Martin & Fleming, 2006), and interaction and reassurance from lecturers and student peers. Students indicated there was need for more practice of specific skills on campus (e.g., budgets using Excel; planning of projects), and more purposeful structured reflection. Skills best learnt on campus were verbal and written communication, along with planning, project and event management. More practice of soft skills was identified, such as presentations. How an organization is structured and functions, and sport in the social context (e.g., working hours/ volunteers; difference between player/administrator; it's not glamorous, but dynamic industry) were also identified as information best learnt on campus. University staff highlighted the importance of a coherent course of study.

Initial pedagogies that were used on placement followed the key steps of a human resource management process (Cuskelly & Auld, 2006):

39

– interview - CV, competitive process; and
– induction - systems, processes and policies - manual for students and supervisors.

The students were treated as staff with expectations of student and supervisor discussed and clearly established. A need was identified to help supervisors adopt more empowering management skills and to help students take ownership of their projects earlier. Performance review was both informal and formal, with training being offered that provided the student with a '360 experience' of the organization. It was highlighted that skills, knowledge, and theory learnt on campus also needed to be developed at the placement, along with the specifics and operations of the organization (e.g., specific databases). An important supervisor role identified on placement was mentoring and offering career advice.

CONCLUSIONS AND IMPLICATIONS

The focus of this current study is to build understanding of WIL practice. Given the current, and likely worsening, skill shortage reported in New Zealand, WIL programs provide a potent vehicle for producing work-ready graduates in strategic areas - namely those that form the core of this study; science & engineering, business & management, and sport studies. As WIL practitioners and senior researchers develop relationships with other practitioners, and enhance their own practice, the opportunity for research to both strengthen those relationships and inform practice is presented by this proposed study. The findings may also help to reinforce what can be achieved through WIL programs, and through dissemination of the findings raise awareness amongst tertiary education institutions (TEIs) of the future possibilities available via this pedagogy. This is considered particularly important because despite its well-documented advantages WIL is often seen in simplistic terms by TEI – for example, as a simple recruitment tool (see, Coll, 1996; Weisz & Chapman, 2004).

The preliminary findings from the sport context indicate that the practicum experience is a point of difference that employers value. Learning occurs from a variety of sources and a variety of modes. However, further investigation is needed into pedagogical approaches that can be used to better satisfy the differing needs of internal, extramural, and postgraduate students.

REFERENCES

Boud, D., & Falchikov, N. (2006). Aligning assessment with long-term learning. Assessment and Evaluation in Higher Education, 31(4), 399-413.

Braunstein, L.A., & Loken, M.+K. (2004). Benefits of cooperative education for employers. In R.K. Coll & C. Eames (Eds.), International handbook for cooperative education: An international perspective of the theory, research and practice of work-integrated learning (pp. 237-246). Boston: World Association for Cooperative Education.

Burchell, N., Hodges, D., & Rainsbury, L. (2000). What competencies do business graduates require? Perspectives of New Zealand stakeholders. Journal of Cooperative Education, 35(2-3), 11-20.

Coll, R. K. (1996). The BSc (Technology): Responding to the challenges of the education marketplace. Journal of Cooperative Education, 32(1), 29-35.

Coll, R.K., & Zegwaard, K.E. (2006). Perceptions of desirable graduate competencies for science and technology new graduates. Research in Science and Technological Education, 24(1), 29-58.

Cuskelly, G., & Auld, C. (2006). Human resource management. In S.I. Leberman, C. Collins, & L. Trenberth (Eds.), Sport business management in Aotearoa/New Zealand (255-272). Melbourne: Thomson.

Dressler, S., & Keeling, A. E. (2004). Benefits of cooperative education for students. In R.K. Coll & C. Eames (Eds.), International handbook for cooperative education: An international perspective of the theory, research and practice of work-integrated learning (pp. 217-236). Boston: World Association for Cooperative Education.

Eames, C. (2003). Learning through cooperative education. Unpublished PhD thesis, University of Waikato, Hamilton, New Zealand.

Eames C., & Bell, B. (2005). Using sociocultural views of learning to investigate the enculturation of students into the scientific community through work placements. Canadian Journal of Science, Mathematics and Technology Education, 5(1), 153-169.

Franks, P., & Blomqvist, O. (2004). The World Association for Cooperative Education: The global network that fosters work-integrated learning. In R.K. Coll & C. Eames (Eds.), International handbook for cooperative education: An international perspective of the theory, research and practice of work-integrated learning (pp. 283-289). Boston: World Association for Cooperative Education.

Groenewald, T. (2004). Towards a definition of cooperative education. In R.K. Coll & C. Eames (Eds.). International handbook for cooperative education: An international perspective of the theory, research and practice of work-integrated learning (pp. 17-25). Boston: World Association for Cooperative Education.

Guba, E. G., & Lincoln, Y.S. (1994). Competing paradigms in qualitative research. In N.K. Denzin & Y.S. Lincoln (Eds.), Handbook of qualitative research (pp.105-117). Thousand Oaks, CA: Sage.

Martin, A.J., & Fleming, J. (2006). Facilitated reflection in cooperative education in sport. In R.K. Coll (Ed.). Proceedings of the 9th New Zealand Association for Cooperative Education Conference [on-line], 27-28 April, Queenstown, New Zealand: NZACE.

Martin, A.J., & Leberman, S.I. (2005). Keeping up with the play: Practicum, partnership and practice. Asia Pacific Journal of Cooperative Education [On-line], 6(2), 17-25 (retrieved from: http://www.apjce.org/).

Merriam, S.B. (1998). Qualitative research and case study applications in education. San Francisco: Jossey-Bass.

Miles, M.B., & Huberman, A. M. (1994). Qualitative data analysis. Thousand Oaks, CA: Sage.

Sovilla, E.S., & Varty, J.W. (2004). Cooperative education in the USA, past, present: Some lessons learned. In R.K. Coll & C. Eames (Eds.), International handbook for cooperative education: An international perspective of the theory, research and practice of work-integrated learning (pp. 3-16). Boston: World Association for Cooperative Education

Ward, N., & Jefferies, A. (2004). 'The Analytical Club': A unique cooperative education link between industry and academia. Asia-Pacific Journal of Cooperative education, 5(1), 15-18.

Walters, R. (1947). Herman Schneider. Founder of the cooperative system. In University of Cincinnati – Four decades of the cooperative system. Fortieth anniversary program. October 16, 1946, Cincinnati, OH: Cincinnati University Library.

Weisz, M., & Chapman, R. (2004). Benefits of cooperative education for educational institutions. In R.K. Coll & C. Eames (Eds.), International handbook for cooperative education: An international perspective of the theory, research and practice of work-integrated learning (pp. 247-258). Boston: World Association for Cooperative Education

Yin, R.K. (1994). Case study research: Design and methods. Thousand Oaks, CA: Sage.

Reflection and review: confessions of placement students

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INTRODUCTION

Cooperative education combines work experience with academic courses with the aim of producing competent graduates. Competency in a specific task depends on a person's ability and confidence to carry it out (Coll, Lay, & Zegwaard, 2001). University education provides the student with ability or skill set, but work experience helps provides them with the confidence to use those skills. Reflective practice is becoming recognised as a valuable teaching and learning tool (Hancock, 1998; Richardson, & Maltby, 1995). Being able to reflect on personal experiences allows students to recognise areas where they do and do not have competency, why they might have succeeded or failed, and determine strategies by which they can overcome their limitations. It also gives them a better understanding of why they are doing it (Millonzi, & Reitano, 1977). Hence combining personal experiences with reflection can facilitate transforming knowledge into competency (Canale, & Duwart, 1999). In addition reflective practice provides students with greater self awareness which is useful when they are promoting themselves to prospective employers (Coll, Lay, & Zegwaard, 2001).

Cooperative education (co-op) at the University of Waikato has been practiced for over 20 years through the Bachelor of Science and Technology (BSc(Tech)) degree, which began in 1984, and the engineering (BE) degree, which was first offered in 2001. Both are four year degrees with six to 12 months work experience. Approximately 200 students enrol annually. BE and BSc(Tech) students are encouraged to use reflective practice as a learning tool while on placement. This is assessed through their work placement report, submitted after completing their placement, where students are expected to write about their experiences and discuss what they gained from them. The reflection and review contributes about 10% to the student's overall placement grade. Students are not specifically provided any training in reflective practice, apart from some general guidelines in the work placement manual that is given to all BE and BSc(Tech) students.

While reflective practice is encouraged, no study has been undertaken at the University to examine what students have gained from their placements and how well they perform in reflective practice. Student reports have been held by the School since the work placement programme began. These were analysed to investigate student ability to reflect on their personal development and learning.

METHODOLOGY

The engineering department at the University of Waikato have retained copies of placement reports dating back to 1994. A qualitative analysis was performed on student's reflection and reviews from students enrolled in science and engineering co-op degrees in forestry and materials and process engineering. The data was collated, analysed for reoccurring themes and pools of meaning constructed. Key phrases were used as examples in the study and pseudonyms have been used to preserve confidentiality.

RESULTS

In general, most students' reflection and review covered a wide range of themes including soft and hard skills learnt, work place challenges, personal and career development and future work aspirations. However, the quality of the reflection and review varied and appeared to be dependent on the quality of the student and their report writing. We noted that the majority of students have difficulty in self assessment and introspection when writing their reflection and review. We have observed that the overall quality of student reflection and review has diminished since 2002, with last year being the worst. This could be due to a lack of emphasis on our behalf but we have specifically addressed this issue and intend to introduce it more thoroughly in this year's course.

Soft and Hard Skills

Of interest was that students more commonly reported learning soft skills, such as developing communication skills, teamwork and establishing good working relationships which was important in on-the-job learning and creating a positive environment.

Students failed to recognise that they had indeed learnt and were applying hard skills. For example, David (all names used here are pseudonyms) found although his work was in the field of mechanical engineering, the only theory applied was finite element analysis modeling from his fourth year course. David was designing heavy apparatus therefore he was obviously applying basic design fundamentals and CAD skills taught in his courses. This indicates that students need assistance to link what they have learnt and applied in the workplace to university courses.

One student commented how working in a placement doing research was quite different to doing laboratory experiments in a university course because the employer needed accurate and reliable data, so there was a strong emphasis on doing the work correctly and rigorously so that her data could be used. Whereas, in the experiments it did not matter how accurate the data was or how well the experiments were done because there was nothing at stake, only a grade. This showed that students were learning about scientific ethics in the workplace, something not specifically taught at the University.

Where students have been in placements unrelated to their field of study, they were still able to make links between theory used and that taught at University. For example, Adam was completing a materials degree and did a placement with an electricity company. He found that the principles behind electricity theory were very similar to processing concepts such as mass balances; the equations were similar but needed different numbers, units and symbols. This reflected the student's ability to see the similarities between mass and electricity theory.

Harry suggested that placement students could benefit more if they were given data from a project to analyse so they could gain some skill in data interpretation. Typically students were employed to gather data, but had little involvement in the analysis and interpretation.

Knowledge of Industry

Students reported that the placement gave them a greater understanding of the general industry, company management structure and how a company operates. Students also learnt about what constitutes constructive and empowering management, such as good management systems and effective communication, and how to conduct meetings.   Paul noted his employer used incentives to increase performance while Cameron and Bruce recognised the importance of teamwork to generate or develop ideas. Students also quickly recognized bad management practices, for example David noting that his employer's management style led to a high staff turnover.

For students working in research institutes, they recognised that applying for funding can occupy a large proportion of scientists' time. Pat found that due to pressures of obtaining funding, scientists at the Crown Research Institute where she was employed spent more time in the office, delegating tasks to technicians. Others, like Mark gained an understanding that good science had to be balanced with generating profit and growth within the company.

Brian realised the importance of good note keeping as this was of great importance to the functioning of the company he was working for, he commented:

I also learnt to put into practice what I have been performing at university, for example keeping good lab notes are very important in this line of work and sometimes patents can be won or lost if poor notes are kept. Learning the correct way of preparing the notes and what information is important to note down for future reference was the main focus.

It was interesting to note that although different students that had been placed with the same company over consecutive years, all noted similar management issues such as poor communication between supervisors, contractors and employees, and poor organization.
Joe critiqued:

Everybody within [the company] must be on the same wavelength of thinking. All departments should have targets and goals set and strive to reach them. That type of attitude will turn the company into a more positive frame of mind.

It seems that the placements open students' eyes to possible career opportunities within and outside their field; the placement seems to dictate what they want to do in future.

Report Writing

Some students have indicated that report writing is a skill that they have struggled with during the placement papers. Some have learnt the value of report writing through their placement experience such as Adam who identified the importance of this skill in industry:

I also got to see what is required in a professional report and the standards used in filing and data tracking. With this I also built a better idea on what is required from engineering work in the real world.

Some students appear to find it difficult to write a report on routine work, such as labouring in an engineering company, or doing analytical work in a chemistry laboratory. This is likely to be due to being trained at University to write about projects from their lab and project work, that is, introduction, method, results and conclusion. Kelly felt that having a project to work on would have made writing a report easier:

My first thoughts were that a project to work on and form a report on, would have been the most desirable focus for my placement. This may have been easier to successfully write my report on, and may also have been of more value to the company.

CONCLUSIONS AND IMPLICATIONS

The review and reflection section of the placement reports have given us an interesting insight into our students perspectives of their learning during a placement. In general students have difficulty 'reflecting' on their work placement experiences evidenced by the lack of detail, and failure to elaborate on skills obtained. This could be due to student laziness, or that students lack effective reflective skills, or because students do not perceive 'reflection' as being a necessary skill. However, some students have written thoughtful accounts of what they have learnt, observed and encountered during their placement, providing insight into knowledge and understanding gained. These students appear to have gained valuable appreciation into company functioning, hard and soft skills gained and applying theory learnt at university in an industry setting. A common theme students mentioned was the difficulty they have in writing technical reports, particularly where placements involved routine work.

Reflective practice is not taught at the University of Waikato as part of the preparation for work placements, therefore training programmes could be implemented to improve student performance in this area.

Future work will include a more thorough investigation into the key themes that we have obtained from this preliminary research, and expanding the field of research to placement reports from other fields such as biology, chemistry and earth sciences.

REFERENCES

Canale, R., & Duwart, E. (1999). Internet based reflective learning for cooperative education students during co-op work periods. *Journal of Cooperative Education, 34*(2), 25-34.
Coll, R.K., Lay, M.C., & Zegwaard, K.E. (2001). The influence of cooperative education on student self-efficacy towards practical science skills. *Journal of Cooperative Education, 36*(3), 58-72.
Hancock, P. (1998). Reflective practice – using a learning journal. *Nursing Standard, 13*(17), 36-39.
Millonzi, J.C., & Reitano, J. (1977). The art of thinking. *Journal of Cooperative Education and Internships, 15*, 12-15.
Richardson, G., & Maltby, H. (1995). Reflection-on-practice: Enhancing student learning. *Journal of Advanced Nursing, 22*, 235-242.